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Observations on Bosc's Monitor Lizard (<i>Varanus exanthematicus</i>) in the Wild	Daniel Bennett	177
New Distributional and Variational Data on Some Species of Lizards from Chihuahua, Mexico	Julio A. Lemos-Espinal, Hobart M. Smith and David Chiszar	181
Book Review: <i>Chameleons: Nature's Hidden Jewels</i> by Petr Nečas	Ilene Sievert	187
The Tympanum	Roger Conant; Carole Allen; James W. Grier; Martin Nelson	188
HerPET-POURRI	Ellin Beltz	189
Unofficial Minutes of the CHS Board Meeting, July 14, 2000		192
Herpetology 2000		195
Advertisements		199
News and Announcements		200

Cover: Juvenile Bosc's monitor, *Varanus exanthematicus*, from Abokobi, southern Ghana. Photograph by Daniel Bennett.

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Observations on Bosc's Monitor Lizard (*Varanus exanthematicus*) in the Wild

Daniel Bennett
Department of Zoology
University of Aberdeen
Tillydrone Avenue
Aberdeen AB24 2TZ
Great Britain

Bosc's monitor lizard (*Varanus exanthematicus*) is a popular animal in the reptile trade. Between 1990 and 1998, declared exports of live Bosc's monitors from four African countries (Ghana, Togo, Burundi and Mali) totaled 214,067 animals. Despite its popularity, there are few records of captive breeding in this species (Bennett, 1995) and very little has been written about its way of life in the wild. Most of the literature on this lizard treats it as identical to the white-throated monitor lizard (*Varanus albigularis*), a much larger species that is found in southern parts of the continent. This is unfortunate, because Bosc's monitor is a tropical species that lives in a very different environment from its larger cousin. The purpose of this article is to summarize what I have learned about the ecology of Bosc's monitor lizard in the West African country of Ghana, during three short visits between 1994 and 1997.

My work on Bosc's monitor has concentrated on juvenile animals. The reasons for this are that very little is known about the ecology of any juvenile monitor lizard and it is this age class that is targeted for the pet trade. Also, while the adults of this species are widely dispersed through grassland habitats, the juveniles show a clustered distribution around fields. Thus they are much easier to find than the adults. Over six months of field work I have caught 360 juveniles and only 23 adults! The latter are usually found in burrows made by squirrels or rodents, or in abandoned termite mounds, but in July 1997 I saw a large Bosc's monitor swimming across the Black Volta River at Bui National Park in the north of Ghana. This species is not normally associated with water bodies (in contrast to the Nile monitor, *V. niloticus*) and I presume it was moving from one grassland area to another. Another adult was found in woodland in the forest/savanna transition zone at Krachi Nkwanta in the east of Ghana, close to the Togo border. Otherwise I have never found Bosc's monitor in riverine or forest habitats. The smallest mature female we have found weighed 390 g. The largest male we have found measured 43 cm snout-vent length and was completely lacking its tail.

According to reliable local sources, adults are most active during the breeding season of November and December. Contrary to my previous statement (Bennett, 1995) that nests are probably located in elevated sites on hillsides, I have found three nests of this species containing 6, 15 and 29 eggs, all in farmland with sandy soils. All the eggs had hatched, with the exception of a single egg that was still in the process of hatching when discovered. These nests were about 20 cm deep. In this area the eggs hatch in March and April (earlier than the June-July period suggested by Cissé [1976] in Senegal). Newly hatched monitors weigh 6-7 g. This is lower than the weights of 9-11 g reported for captive-bred animals (Roder and Horn, 1994). Eidenmüller (1992) and Phillips and Packard (1994)

have shown that the weight of neonate monitors depends largely on levels of humidity experienced during incubation. Artificially incubated eggs are invariably incubated with 100% humidity; the lower humidity experienced by eggs in the wild is probably responsible for the lower hatching weight.

Anecdotal information suggests that the newly hatched lizards do not leave the nest immediately; possibly groups of hatchlings remain together in the nest until conditions outside become more favorable. The stimulus to leave the nest is unknown. In the desert-dwelling monitor lizard, *V. griseus*, the youngsters may remain below ground for up to six months before emerging (Tsellarius and Cherlin, 1994); in Bosc's monitor lizard the period is likely to be no more than a few days. On emergence from the nest the hatchlings immediately seek shelter in burrows. In the coastal plain of Ghana, where most of my studies have been performed (and where all animals for export are collected) the juveniles make for the burrows of the giant cricket *Brachytrupes membranaceus*. This is the largest cricket in Africa, weighing about 3-4 g. The giant cricket has an extraordinary life cycle. Males dig burrows averaging 20 cm deep in sandy soils and call from the entrance to attract females, which are lured into the burrow and imprisoned in a "walled up" cell at the end of the tunnel. Breeding occurs annually, after which all the adults die. Hatchling monitor lizards are not much larger than the crickets whose burrows they inhabit. During March and April I have found four recently hatched monitor lizards sharing burrows with crickets. This situation does not last long however. The lizards grow rapidly and in a few weeks they are large enough to devour their hosts. From this point on the giant cricket becomes one of the most important food items of juvenile Bosc's monitors. The cricket is a well known agricultural pest in Africa and there is no doubt that the monitor lizards play a significant role in reducing their populations in farmland.

Although the lizards grow quickly, they are able to continue using the burrows of giant crickets by enlarging the diameter of the holes. This they appear to do using both the claws and the sharp ridges on the side of the head, producing a distinctive shape at the burrow entrance. These holes provide juvenile lizards with abundant shelter for the first few months of life, and the fields they are born in appear to provide plenty of food. One apparent advantage of using cricket holes over those dug by larger animals is that the small diameter may preclude many important predators. Away from farmland I have found juvenile lizards only infrequently, usually on the trunks or branches of small trees. These animals appear to eat similar prey to those in farmlands. Whether they are really less common in these areas, or just more difficult to find, is uncertain.

Little is known of the natural predators of Bosc's monitor



Juvenile Bosc's monitor, *Varanus exanthematicus*, with scars on head from a predation attempt. All photographs by the author.



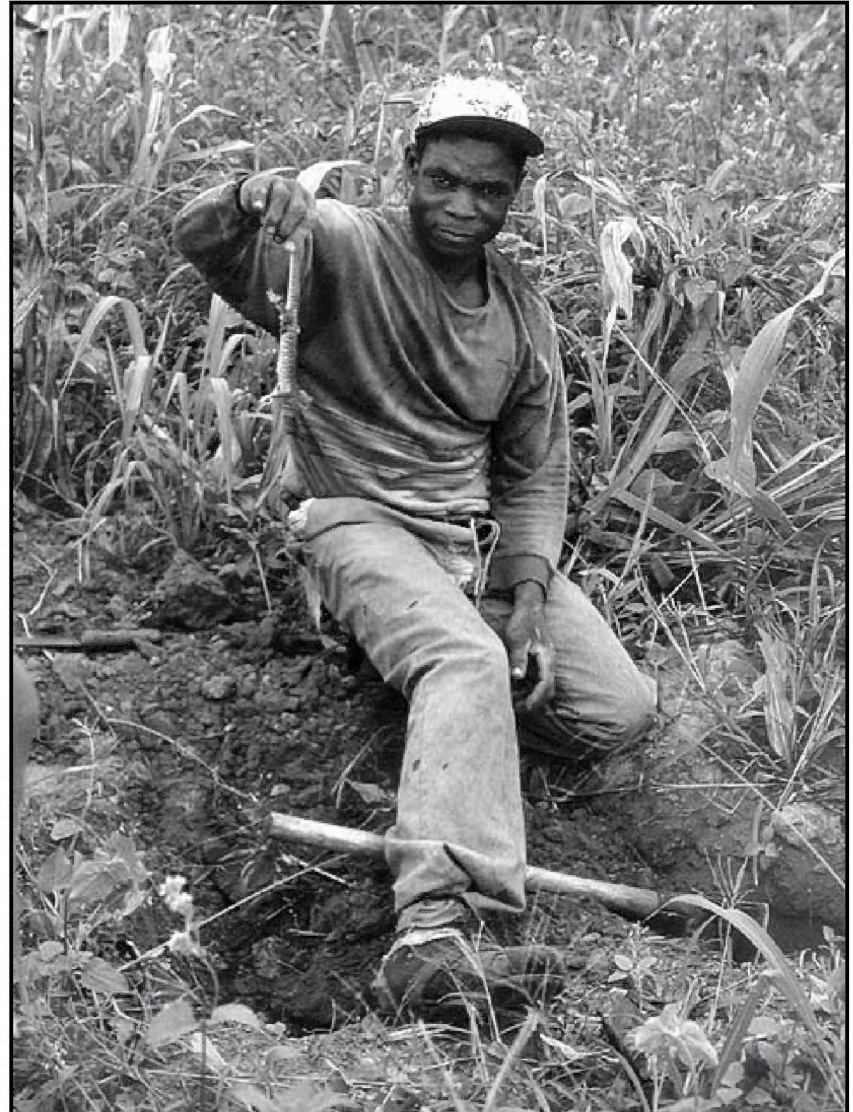
Adult *V. exanthematicus* from Agomeda, southern Ghana.



Hatchling *V. exanthematicus* dug out of a nest at Abokobi, southern Ghana.



Adult *V. exanthematicus* from woodland at Krachi Nkwanta, northeast Ghana.



Bature Ali with a juvenile *V. exanthematicus*, caught for export to the U.S. at Abokobi, southern Ghana.



Well camouflaged juvenile *V. exanthematicus* at Katomensa, southern Ghana.



Adult *V. exanthematicus* at Kokrobite, southern Ghana.

lizard, but I suspect that snakes and birds are among the most important. On one occasion we found a snake that had eaten a juvenile lizard (Bennett and Basuglo, 1998). On another occasion we found on a path a young adult female, which appeared to have been dropped by a bird. In the coastal plain of Ghana snakes (most notably the spitting cobra) are common in uncultivated areas, where they occur in termite mounds and burrows. But they are rarely seen in farmland, during the day at least. This probably reflects the lack of suitable refuges available for the snakes in this habitat.

Farmlands also provide the young monitor lizards with plenty of food. Orthopterans (giant crickets, smaller crickets and locusts), scorpions (primarily the large black scorpion, *Pandinus imperator*, that is also collected for the international live animal trade), snails, slugs and amphibians are the most common prey of juveniles (Bennett, 2000; unpublished data). With the exception of locusts, all of the prey animals of juvenile Bosc's monitor lizards are nocturnal or crepuscular in behavior. Because monitor lizards are active during the day, it is presumed that the lizards find most of their food in burrows. Thus farmland provides a plentiful food supply in a relatively predator free environment. How long the juvenile lizards are able to stay in the fields is uncertain. Presumably they are forced to leave when they outgrow the available shelters, which appears to be before the young of the next year hatch. Growth rates in the wild can be estimated from measurements of animals taken at different times of the year (Figure 1). The data indicate that there is a lot of variation in the growth rates of young monitors, but whether this is due to differences in growth rates between males and females is unknown. Within

six months snout-vent length can double or triple. At the same time body weight increases an average of about 14 times to around 90 g, but a few animals achieve body weights of over 250 g, a 35-fold increase!

The average increase between March and September suggests a similar growth rate to that of *V. bengalensis* (Auffenberg, 1994) in northern India, where feeding and activity are suspended for several months from the age of about five months. Juvenile Bosc's monitors eat large amounts of food. They consume much bigger prey than juvenile Nile or Bengal monitors of a similar size, regularly consuming animals weighing more than 20% of their own body weight. However, I have found no evidence that this voracious feeding is related to a subsequent fasting period as reported for adult Bosc's monitors in Senegal (Cissé 1972), adult white-throated monitors in Namibia (Phillips, 1995) and juvenile *V. bengalensis* in northern India (Auffenberg, 1994). It seems likely that in more tropical areas fasting is either reduced or even absent. What is most surprising is that adults in the coastal plain of Ghana appear to be inactive late in the wet season (August–September), when there are still abundant food supplies, for juveniles at least. Cissé (1972) found this to be the time of highest food consumption in Senegal. The few adults I have found at this time of year were all dusty and cold (26.5–28°C), and their feces contained very few food items. Like juveniles, adult Bosc's monitors feed on amphibians and invertebrate prey. In Ghana, adults eat most of the prey taken by juveniles (but not the giant cricket) and also take large millipedes (*Iulus* spp). The only example I have found of this lizard feeding on mammals is the discovery of rodent hair (probably mouse) in the

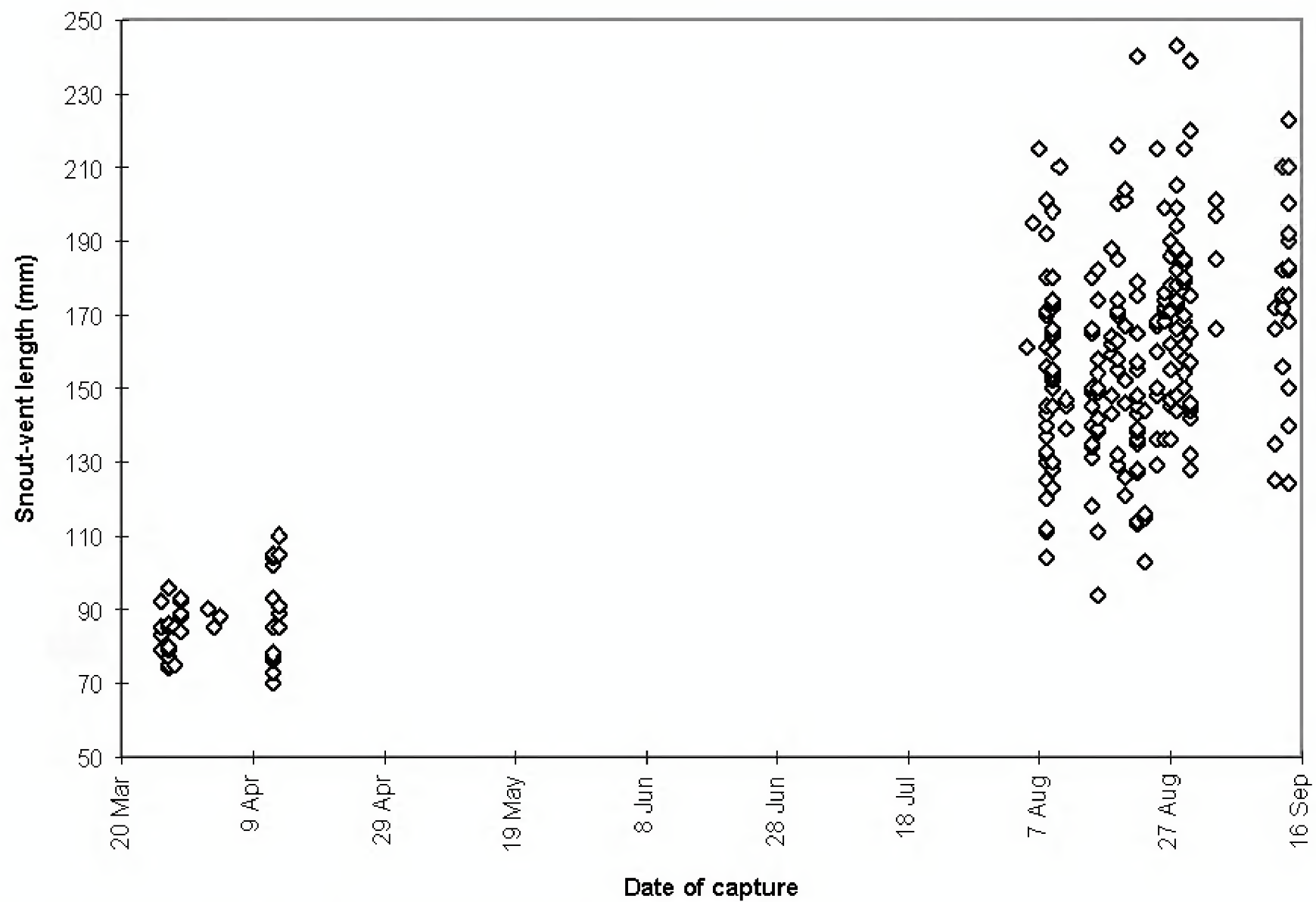


Figure 1. Body lengths of young Bosc's monitor lizards (*Varanus exanthematicus*).

feces of an animal from woodland at Krachi-Nkwanta (see above). Whether this represents a different feeding strategy in this area or is simply a rare event is unknown.

My investigations suggest that the commercial exploitation of monitor lizards in the coastal plain of Ghana is not a cause for concern at present (Bennett, in press). Although the number of animals taken per year is large, Bosc's monitor is widespread and abundant in this area and collecting is unlikely to have a deleterious effect on population size overall. What is more worrying is that virtually none of the lizards exported appear to reproduce in captivity, and it is possible that only a very small percentage even survive to maturity. Those that do tend to be obese, lethargic, and often unwanted creatures. In this respect I agree with Good (1998) who stated that a diet of rodents is inappropriate for an animal known to be essentially insectivorous and molluscivorous. However Good's article contains many serious factual errors and is not authoritative.

Bosc's monitor lizard has the potential to be a very rewarding animal in captivity, but unless its basic needs are met the experience will be bitter for the keeper and fatal for the lizards. Based on what is known of Bosc's monitor lizard in the wild I suggest the following regime:

1. A deep sandy substrate.
2. A diet of invertebrates, provided generously, with occasional feedings of small rodents.

3. Basking spots of up to 150°F (66°C).
4. Plenty of cool (20–24°C) hiding places.

Total floor area of the enclosure need be little more than 1 m² for successful breeding. Whether it is better to keep animals in groups or to separate them prior to breeding attempts is uncertain. Success seems most likely when groups of youngsters are brought up together. Cannibalism has been reported in captivity but is unknown in wild populations.

The trade in live monitors from Africa is minuscule compared with the trade in skins. Nevertheless, whether continued exploitation of wild animals can be justified given the current very low levels of success with Bosc's monitor is questionable. Many professional breeders claim that they could breed this lizard with no problems, but that their low price makes it unprofitable. Even if this is true, husbandry techniques developed in richer countries could be employed in Africa to raise lizards for the international pet trade, and maybe even to sell to local farmers plagued by giant crickets!

Acknowledgments

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New Distributional and Variational Data on Some Species of Lizards from Chihuahua, Mexico

Julio A. Lemos-Espinal¹, Hobart M. Smith² and David Chiszar²

Abstract

Specimens (298) of 23 selected species and subspecies of lizards collected in 1999 in Chihuahua form the basis for a report of variational and distributional data, supplemented by material from various other collections. Of special note are data on *Barisia imbricata ciliaris*, *B. levicollis*, *Coleonyx brevis*, *Holbrookia approximans*, *Phrynosoma modestum*, *Sceloporus jarrovii*, *S. poinsettii*, *Urosaurus ornatus caeruleus* and *U. o. schotti*.

Among the specimens obtained by JLE in Chihuahua, unless otherwise stated during the summer of 1999, are 623 lizards of about 33 species and subspecies. We here report on 23 species and subspecies, represented by 298 specimens. The other taxa and 325 specimens represent members of five complexes to be reported elsewhere (*Cnemidophorus gularis*, 85 specimens; *C. inornatus*, 27 specimens; *C. tessellatus*, 12 specimens; *Sceloporus grammicus*, 52 specimens; and *S. undulatus* group, 149 specimens).

Most of this material is from areas never sampled herpetologically before, and therefore is of special interest. Because of the remoteness of most localities, coordinates determined by GPS are provided to aid in their fixation, and altitudes are also given. We here cite JLE field numbers, but all specimens are ultimately to be deposited, about equally, in the University of Colorado Museum and in the collections of Unidad de Biotecnología y Prototipos of the Escuela Nacional de Estudios Profesionales Iztacala of the Universidad Nacional Autónoma de México. Common names follow Liner (1994).

Barisia imbricata ciliaris (Smith), Northern Imbricate Alligator Lizard. A single specimen (JLE 4034) was found 26 July under a large oak log on Mesa de Agostadero, Cerro Blanco, municipio Balleza, near km 102 on the Guachochi-Balleza highway (26°54'38.7"N, 106°47'14.1"W), 2356 m. It is a gray-black, dark-colored specimen, not brown, 155 mm S-V, with 41 dorsals in 16 rows (8 on neck), 3-3 superciliaries, anterior superciliary contacting loreal and preventing contact of any supraocular with the preocular; 3-3 postoculars, 1-1 loreals contacting supralabials 3-4 on each side, lowest primary temporal contacting both antepenultimate and penultimate supralabials. In scalation this specimen is conformant with *B. i. ciliaris*, but the dark patterning is very unusual, although matched by one specimen (a photograph of which was made available through the courtesy of Dr. Robert G. Webb) from Playa Azul, Durango, in the middle of the known range of *B. i. ciliaris*. All other adults examined are more or less uniform tan above, hence the darker coloration appears to be a rare variant and not taxonomically significant.

Several specimens of *Barisia* have been reported in the literature (e.g., Van Devender and Lowe, 1977; Guillelte and Smith, 1982) or are catalogued in museums as *B. i. ciliaris* from the Sierra del Nido, Chihuahua, but we have examined nine specimens from there, and all are *B. levicollis*, as we

have confirmed is the specimen reported as that species by Tanner (1987) from Chuhuichupa, Chihuahua. Those ten specimens (BYU 13898; MVZ 66067-8, 68782-3, 70699; UAZ 35462; UTA 17570-1, 17931) all have 44-52 dorsals (all but two 47 or more), vs 45 or fewer in *B. i. ciliaris*; anterior median supraocular in contact with preocular (vs never); mostly 0-0 (1) or 1-1 (7) superciliaries, although 1 has 2-2, and 1 has 3-3 (vs 2-4, usually 3); lowest primary temporal contacting only the antepenultimate supralabial (vs also the penultimate supralabial); and 10 nuchal scale rows (vs 8). All have 16 dorsal scale rows at midbody, and a mostly uniform light tan dorsal coloration, as is also true of *B. i. ciliaris*.

The low number of dorsals (44, in two specimens), and the high number (52, one specimen) extend the previously known range limits (46-51) in *B. levicollis*, slightly overlapping the range in *B. i. ciliaris* (34-45). More important is the occurrence of 2-2 superciliaries in one *B. levicollis* (MVZ 68783), previously recorded always with 1-1, and, even more unusual, one specimen (UTA 17570) with 3-3 superciliaries. The superciliaries in the former do not reach the preocular, however, and although in the latter the anterior superciliary does touch the preocular, the anterior medial supraocular still is in broad contact with the prefrontal. In no *B. levicollis* is there a contact of loreal and superciliary, whereas it occurs in all *B. i. ciliaris*.

Two juveniles of *B. levicollis*, 45 mm S-V, exhibit more of a pattern than adults generally do, although the general ground color of both is a light brown. In UTA 17570, narrow vertical black bars are present on the lower 2-3 scale rows of every 3rd or 4th row, each white-edged posteriorly; a series of scale-sized or smaller dark brown spots is present in a median and dorsolateral series on every 4th or 5th scale row. UTA 17571 is much the same except that the vertical black bars extend farther dorsad, to the 4th or 5th scale rows.

The identity of the specimen of "*Barissia imbricata*" reported by Cope (1887) from "south of Chihuahua" and by Cope (1900) from "between Mexico City and Chihuahua" (probably the same) very likely can never be determined, because it appears to have been lost. The only specimen of *B. i. ciliaris* reported in the literature to have come with some certainty from Chihuahua is AMNH 1945, from "Chihuahua" (Guillelte and Smith, 1982: 32). That specimen was listed by Tihen (1949: 248) as *B. levicollis*, but as a lapsus, inasmuch as

1. Laboratorio de Ecología, Unidad de Biotecnología y Prototipos, Escuela Nacional de Estudios Profesionales Iztacala, UNAM, Apartado Postal 314, Avenida de los Barrios s/n, Los Reyes Iztacala, Tlalnepantla, Estado de México, 54090 México.

2. University of Colorado Museum, Boulder, CO 80309-0334.

apparently the same specimen was noted on the same page as a typical representative of *B. imbricata ciliaris*. That identification was confirmed independently by Darrel Frost (pers. com.). Thus the present specimen is the only one representing *B. i. ciliaris* known with certainty from any specific locality in the state of Chihuahua (Good, 1988). It extends the known western range of the subspecies northward about 125 km from Guanacevi, Durango (Guillette and Smith, 1982), east and south of the southern range limit of *B. levicollis*.

Cnemidophorus exsanguis Lowe, Chihuahua Spotted Whiptail. Eight specimens. Three (JLE 3907-9) were taken July 20 in the Sierra San Luis at km 75.1 on the Janos-Agua Prieta highway (31°19'1.8"N, 108°44'38.5"W), 1670 m. Two are immature, at 56 and 63 mm S-V, the other an adult 85 mm S-V, with the fully developed pattern typical of the species. Another typical adult (JLE 2654) is from the base of Cerros Colorados (31°9'4.2"N, 106°22'31"W), 1410 m, 12 July 1998. Four juveniles (JLE 2422-5) were taken NE of Cerros Colorados, at 31°9'55.7"N, 106°17'15.6"W, 1508 m, 3 June 1998. The identifications on all were confirmed by Harry L. Taylor.

Cnemidophorus sonora Lowe and Wright, Sonoran Spotted Whiptail. Two specimens (JLE 3902, 3904), 58 and 73 mm S-V, identified by Harry L. Taylor, were taken July 20 at km 68 on the Janos-Agua Prieta highway, 3 km W of a GPS site, 31°15'54.2"W, 108°36'32.5"W.

Cnemidophorus tigris marmoratus Baird and Girard, Western Marbled Whiptail. Eleven specimens, all adults. JLE 4257 was taken 30 August on the sand dunes near La Bamba, on the west side of the Sierra La Lágrima (30°5'11.7"N, 105°24'30.8"W), 1380 m. JLE 1966, NE of Cerros Colorados (31°9'6.1"N, 106°22'31.3"W), 1419 m, 4 October 1997. JLE 2003, dunes 2 km NE Rancho El Setenta (31°9'18"N, 106°27'47"W), 1370 m, 4 October 1997. JLE 2402, Rancho El Setenta (31°11'16.2"N, 106°30'20.7"W), 1334 m, 5 October 1997. JLE 2125, 2698, Rancho Ojo de Enmedio (31°22'37.4"N, 106°35'9.7"W), 1285 m, 8 October 1997 and 13 July 1998 respectively. JLE 2841-3, sand dunes NW Rancho Ojo de Enmedio (31°22'45.5"N, 106°35'2.8"W), 1290 m, 16 July 1998. JLE 2503, sand dunes off Hwy 45 at Rancho El Lobo, 2 km E Rancho El Setenta (31°11'50.6"N, 106°29'2.0"W), 1212 m, 5 June 1998. JLE 2885, Rancho El Espejo (31°36'46.2"N, 106°53'41.3"W), 1250 m, 18 July 1998.

Cnemidophorus uniparens Wright and Lowe, Desert Grassland Whiptail. Nine specimens were taken, identified by Harry L. Taylor. Three are from the extreme northwestern corner of the state, including JLE 3900-1, from Hda. de San Luis, an abandoned ranch at km 65 on the Janos-Agua Prieta highway (31°15'54.2"N, 108°36'32.5"W), 1520 m, and JLE 3903, from km 68 on the same highway, all taken July 20. The other six were taken July 21 in the northern central part of the state: JLE 3919, 3921, km 40 E Moctezuma (on Hwy 45 N Chihuahua), at Arroyo El Pujido, Puerto El Gallo (30°8'2.0"N, 106°4'56.4"W), 1559 m; JLE 3924-7, km 24 on the same road (30°10'0.0"N, 106°13'16.9"W), 1463 m. *C.*

inornatus heptagrammus was also taken at 40 km E Moctezuma, hence the two species are sympatric. All *C. uniparens* were readily distinguished by having only six stripes and enlarged postantebrachials.

Coleonyx brevis Stejneger, Texas Banded Gecko. A single specimen (JLE 4247) was found under a rock 29 August at Rancho La Bamba (30°3'52.5"N, 105°19'47.9"W), 1510 m. It is a juvenile, 35.5 mm S-V, with five broad intact cross-bands on body (not disintegrated), 8 encircling the tail, and 2-2 femoral pores separated by 5 scales. The only other record of the species in the state of Chihuahua is for 2 mi N, 6 mi E Camargo (Chrapliwy and Fugler, 1955: 121, 123). The present record is northeast of that locality but within the expected range of the species (Dixon, 1970).

Cophosaurus texanus scitulus (Peters), Southwestern Earless Lizard. Seventeen specimens are as follows: JLE 3613-5, 3631, 3742-3, Polvorillas (=Piedras Encimadas), 28°47'36.2"N, 104°13'30.8"W, 1440 m, 6-7 July; JLE 3701-2, 3721-2, Llano El Nito, 1.5 km NE Polvorillas, 8 July; JLE 3751, Cañon del Pegüis, 29°32'1.4"N, 104°47'39.4"W, 10 July; JLE 3766, Ejido Ojo del Carrizo, 82 km N Coyame, 29°58'27.5"N, 105°15'45.8"W, 1459 m, 12 July; JLE 4161, Entronque La Perla, 28°17'59.8"N, 104°33'5.0"W, 1621 m, 27 August; JLE 4207, Sierra Azul, Manuel Benavides, 29°6'52.5"N, 103°55'37.6"W, 1200 m, 27 August; JLE 4261, betw Rancho La Bamba and Rancho La Bambita (latter at 30°17'41.5"N, 105°26'53.8"W, 1460 m, 30 August; JLE 4266, 29°56'46.9"N, 105°20'0.3"W, 1490 m, August 31; JLE 4290, Cerros Tres Castillos, 1.5-2.5 km S 29°54'41.8"N, 105°42'13.7"W, 1260 m, 31 August.

Total femoral pore counts on 16 specimens vary from 28 to 33, falling within the expected range of the subspecies. The localities represented lie within the known geographic range, but in a large area of eastern Chihuahua in which Peters (1951) recorded no samples.

Crotaphytus collaris fuscus Ingram and Tanner, Chihuahuan Collared Lizard. Three specimens were taken: JLE 3873, 14 km N Coyame, rd to El Carrizo (29°33'24.5"N, 105°11'10.2"W), 1295 m, 17 July; JLE 4249, Rancho La Bamba (30°3'52.5"N, 105°19'47.9"W), 1510 m, 29 August; and JLE 4267, 900 m NW Rancho Charco de la Yegua (29°54'6.5"N, 29°28'58.9"W), 1420 m, 31 August.

All are adults, 87-100 mm S-V, two males and a female, and all are tan or gray-brown above on head and trunk, with no trace of green or yellow. Four scales of the supraorbital semicircles are in contact medially, none fused. The female (4249) is unusual in possessing a series of four jet-black, sub-circular spots ~3 mm in diameter in a row along the sides of the abdomen at the junction of the dorsal and ventral colors. Several smaller black dots lie in a row ventral to the larger ones.

The specimens are from well within the recorded geographic range of the subspecies, and conform with its diagnostic characters (Ingram and Tanner, 1971). McGuire (1996: 9, 79) failed to recognize subspecies of *C. collaris*, inasmuch as he

was not concerned with diversity below the species level. Taxonomy should, however, embrace diversity to its lowest practical level, namely subspecies, even though the latter are incompatible with cladistic methods. Taxonomy does not exist for cladists alone; many naturalists are concerned with subspecies as well as species. Furthermore, the claim that phylogeny cannot be traced below the species level is not true; subspecies phylogeny in any given species is commonly of interest and approachable, even though it is claimed not to be compatible with cladistic methods. We accordingly continue to recognize the subspecies of *C. collaris*, and of other species, insofar as they diagnosable at least at the 70% level.

Eumeces brevirostris bilineatus Cope, Two-lined Shortnose Skink. A single specimen, JLE 3984, was found 25 July under a pine log at km 33 S Creel on the highway to Guachochi (27°31'42.0"N, 107°30'11.2"W), 2231 m. The distribution summarized by Tanner (1987) blankets the present locality.

Eumeces obsoletus (Baird and Girard), Great Plains Skink. Two specimens. One, a large adult, 114 mm S–V (JLE 3573), was found 4 July under a small rock at the base of a mesquite tree at Entronque La Perla (El Berrendo), municipio Coyame (28°17'59.8"N, 104°33'5.0"W), 1621 m. The other is a black juvenile 35 mm S–V (JLE 3872) taken in a dry arroyo in the town of Camargo 16 July. These records complement those indicated by Hall (1976) for southeastern Chihuahua.

Gambelia w. wislizenii (Baird and Girard). Fifteen specimens: JLE 1864, Rancho El Tule, 4 June 1997; JLE 2652, sand dunes of Ejido Guadalupe (31°12'24.5"N, 106°15'20.5"W), 1655 m, 11 July 1998; JLE 2696, 2839–40, 3201–8, sand dunes of Rancho Ojo de Enmedio (31°22'37.4"N, 106°35'9.7"W), 1285 m, 13, 16, 18 and 21 July 1998; JLE 2844, Rancho El Espejo (31°36'46.2"N, 106°53'41.3"W), 1250 m, 18 June 1998. All localities fall within the known range of the species in northern central Chihuahua (Tanner, 1987).

Holbrookia approximans Baird, Dickerson's Earless Lizard. Seventy-six specimens are referred to this species, following Axtell (1998): JLE 3585, 3589, 3597, Cerro La Cañada, nr La Perla (=El Berrendo), 28°17'59.8"N, 104°33'5.0"W, 1684 m, 5 July; JLE 3605, 3648–50, 3657–61, Polvorillas (=Piedras Encimadas), 28°47'36.2"N, 104°13'30.8"W, 1476 m, 6–7 July; JLE 3667–85, 3703, 3721, 3723–36, 3739–41, Llano El Nito, a flat area 1.5 km NW Polvorillos, but a quite different landscape, 8–9 July; JLE 3830–9, 3843, 3863–7, Lomas El Berrendo, 42 km N Coyame, rd to Ojo del Carrizo, 14–16 July; JLE 4055–6, 4077, Carril El Píal, a horse racetrack 5 km W Jiménez, 27°7'57.4"N, 104°58'20.4"W, 2272 m, 28 July; JLE 4270–5, grassland 1.5–2.5 NE Cerros Tres Castillos, 29°54'41.8"N, 105°42'13.7"W, 1260 m, 31 August; JLE 4329, grassland surrounding Cerros Santa Anita, 29°40'14.1"N, 105°19'13.6"W, 1 September.

In addition, data have been taken on 30 more specimens in UCM: 12785–6, 50 mi N Cd. Chihuahua, Hwy 45; 12781, 90 mi N Cd. Chihuahua; 16321, 7 mi NE Escalón; 16296–8,

16300–9, 16311–20, 18 mi S Gallegos; 49598, 7 mi N Jiménez; 41411, 17.6 mi S Jiménez; and 41412, 20.1 mi S Jiménez.

The largest male in the 106 examined is 67 mm S–V, the largest female the same. The S–V length is 60 mm or more in 21 of 61 males (34%), in only 4 of 45 females (8%).

These specimens are clearly different from the adjacent, northern *H. maculata bunkerii* in having a shorter tail. In these specimens, the tail/S–V ratio in 53 males is .80–1.16, $\bar{x}$ =.92, in 32 females .64–.84, $\bar{x}$ =.78, and only in 5 males (9%) is the ratio 1.0 or higher. In *H. m. bunkerii*, the ratio in 12 males is 1.0–1.16, $\bar{x}$ =1.13, in 6 females .91–1.04, $\bar{x}$ =.97. The fewest internasals in a row between nasals is 3 or 4 in 85% of *H. m. bunkerii*, 37% of the Chihuahua *H. approximans*. The latter are darker and more robust than the former, and adult males often have a fairly large patch of light blue surrounding the lateral abdominal black bars, completely lacking in *H. m. bunkerii*.

On the other hand, the present series of *H. approximans* does not conform in all respects with expectations for the subspecies. Schmidt's (1922) original description, which is the only one available, indicates that three black lateral abdominal bars are present, whereas in the Chihuahua series only six of each sex have 3–3 abdominal black bars, and 3 males and 2 females have 2–3; one female has 1–1, and 3 have 1–2. Furthermore, Schmidt indicates that a large patch of blue surrounds the abdominal black bars, whereas in the Chihuahua series the blue patch is variable, present in about half of the adult males, and absent in all females.

For comparison, 51 presumed *H. approximans* from other states were borrowed for comparison, as follows: **Coahuila**: 4.8 mi W Cuatro Ciénegas (UIMNH 43360); 5.7 mi W Cuatro Ciénegas (UIMNH 43359); 3 mi SW Hipólito (UIMNH 43354–5); 7 mi NE Jaco, Chihuahua (KU 33841); 14 mi E & 16 mi N Ocampo (KU 38103); 41 mi W, 15 mi N Saltillo, Rancho La Pastora (KU 29339–44); 6.3 mi SE San Pedro (UIMNH 43357); 10.9 mi SE San Pedro (UIMNH 6677–83). **Durango**: 5.3 mi NE Bermejillo (UIMNH 43358); 25 mi N Bermejillo (KU 19252–3, UIMNH 20339); 5 mi N Conejos (KU 19250–1); 4 mi E Durango (KU 29142–6); 28 mi W Mapimí (UIMNH 6674–5); 13.5 mi S Tlahualilo (UIMNH 43361); Hda. de Atotonilco, 12 mi SE Yerbánis (KU 40457–61); 10.4 mi SE Zavalza (UIMNH 43356). **Jalisco**: 21 mi W Ojuelos (UIMNH 28149–52). **Nuevo León**: 5 mi W Sabinas Hidalgo (UIMNH 20338). **San Luis Potosí**: 17 mi SW Cd. San Luis Potosí (UIMNH 28153). **Zacatecas**: La Colorada (KU 19262); 1 mi N Ojuelos, Jalisco (UIMNH 6676); 0.5 mi NW Trancoso (UIMNH 40439).

To our surprise, three abdominal black bars occurred on both sides of only 3 of 23 males, 2 of 28 females, and on one side only on 4 and 3 respectively. One female had 1–1. Thus although three abdominal black bars appear to occur only in *H. approximans*, its frequency is low. The large light blue area around the black bars occurred in most males, however, and a small blue area in four females. In some males the blue area was relatively dark and the black bars were indistinguishably subsumed within it; in others the black bars were still distinct

within the blue area. The ontogeny of the abdominal semeions would be of considerable interest. The tail/S–V ratio averaged a little higher than in the Chihuahua series: in 16 males, .83–1.14, $\bar{x}$ =94.5, 6 (37%) at 1.0 or higher, and in 13 females, .72–.95, $\bar{x}$ =82.0. The fewest internasals in a row between nasals were 1–3, but only 28% (14 of 50) were 3. The specimens were all relatively dark and robust, much as in the Chihuahua series.

The largest specimens of both sexes measured 67 mm S–V.

Thus the taxonomic allocation of the Chihuahua series to *H. approximans* is secure, in our opinion, but the significance of the apparent differences remains to be determined.

Holbrookia maculata bunkerii Smith, Bunker's Earless Lizard. Four specimens, essentially topotypes, were taken, JLE 3877–80, rest stop 11.2 km S Samalayuca, Hwy 45, km 307.65, July 18. These were included in the material summarized in the comparisons with *H. approximans* in the preceding account. The largest is a male, 64 mm S–V.

Phrynosoma cornutum (Harlan), Texas Horned Lizard. Eighteen specimens were collected: JLE 3651, 3737, 3745, Polvorillas (=Piedras Encimadas), 28°47'46.2"N, 104°13'30.8"W, 1440 m, 6, 9 July; JLE 3747–8, Rancho El Virulento, 28°45'40.9"W, 104°20'8.5"W, 1502 m, 10 July; JLE 3779, Ejido Ojo del Carrizo, 29°58'27.5"N, 105°15'45.8"W, 1459 m, 13 July; JLE 3847, 38 km N Coyame, rd to Ojo del Carrizo, 29°40'8.7"N, 105°19'10.9"W, 1510 m, 15 July; JLE 4229, 4239, Rancho Agua Zarca, 29°52'39.3"N, 105°26'1.4"W, 1510 m, 29 August; JLE 4240–5, crossing road between Rancho Agua Zarca and Rancho La Bamba (4240, 29°57'1.0"N, 105°22'38.0"W, 1540 m; 4241, 29°58'3.9"N, 105°22'23.5"W, 1550 m; 4242, 29°59'8.4"N, 105°21'56.6"N, 1540 m; JLE 4243, 30°00'47.3"N, 105°21'6.0"W, 1550 m; 4244–5, 30°20'54.1"N, 105°20'20.3"W, 1550 m); JLE 4258, betw Rancho La Bamba and La Bamba sand dunes, 30°4'18.3"N, 105°24'48.7"W, 1510 m; JLE 4268–9, grassland surrounding Cerros Tres Castillos, 29°54'41.8"N, 105°42'13.7"W, 1260 m.

The localities represented fall well within the known range of the species (Price, 1990).

Phrynosoma modestum Girard, Roundtail Horned Lizard. Eight specimens are as follows: JLE 3666, Polvorillas (=Piedras Encimadas), 28°47'36.2"N, 104°19'36.3"W, 1476 m, July 7; JLE 3781, 3784, 3895, Ojo del Carrizo, 29°58'27.5"N, 105°15'45.8"W, 1459 m, July 13; JLE 3891, sand dunes near Rancho Bandejas, 31°18'0.3"N, 106°4'50.3"W, 1170 m, July 19; JLE 3922, Arroyo El Puji-do, Puerto El Gallo, 40 km E Moctezuma, 30°8'2.0"N, 106°4'56.4"W, 1559 m, July 21; JLE 4259, between Rancho La Bamba and the La Bamba sand dunes, 30°3'25.9"N, 105°21'6.3"W, 1490 m, August 30; JLE 4260, 10–15 km N La Bamba, August 30.

All eight are adults, but only one is a male. The tympanum is concealed in all. The localities represented by this series lie well within the known range of the species (Whiting and

Dixon, 1996), but occupy a large void in eastern Chihuahua from which only two records are indicated on their map.

Most of the specimens were injected, thereby revealing by partial eversion an extraordinary, squamous anal valve that we have reported elsewhere (Lemos-Espinal et al., In press). We add here that a considerable area at each side of the groove dorsal to the anterior border of the anus is black, and the color in some examples extends almost to the midline. In all but one there is a small black spot in the center of the postanal pocket. The function if any of these markings is not apparent.

Sceloporus c. clarkii Baird and Girard, Sonoran Spiny Lizard. A single large adult female, 116 mm S–V (JLE 3906) was found on the wall of an abandoned house 5 km W km 60 on Hwy 2 (31°15'54.2"N, 108°36'32.5"W), at 1520 m, July 20. It has 33 dorsals and 11–12 femoral pores. The subspecies was reported from several other localities in northwestern Chihuahua by Tanner (1987).

Sceloporus j. jarrovii Cope, Yarrow's Spiny Lizard. Thirty-eight specimens were taken, all in western Chihuahua. Four are from the northwestern part of the state, in the Sierra San Luis: JLE 3910–3, km 75.1 on the Janos-Agua Prieta hwy (31°19'1.8"N, 108°44'38.5"W), 1670 m, 20 July. All others are from the southern central part of the state: JLE 3947–9, 3962, 8.1 km S Creel on detour to Cabaña Batosarachi, mpio. Bocoyna (27°42'6.9"N, 107°35'6.1"W), 23–24 July; JLE 3985–6, Entronque Cusarare, 16 km S Creel, hwy to Guachochi (27°37'43.5"N, 107°33'9.7"W), 25 July; JLE 3987, km 33 S Creel, hwy to Guachochi (27°31'42.0"N, 107°30'11.2"W), 2231 m, 25 July; JLE 3992–4011, Mesa del Ejido, E side of Guachochi cemetery (26°49'15.6"N, 107°4'9.7"W), 2238 m, 25 July; JLE 4016, toward Balleza from Guachochi (26°57'44.6"N, 107°8'50.3"W), 2509 m, 26 July; JLE 4017–22, Mesa de Agostadero, Cerro Blanco, mpio. Balleza, km 102 hwy Guachochi-Balleza (26°54'38.7"N, 106°47'14.1"W), 2356 m, 26 July.

Only six adults are among these 38 specimens — two from the north (Sierra San Luis), and four from the more southern localities. The northern adults are essentially the same in pattern as specimens of the subspecies from the U.S., having a distinct black collar bordered both anteriorly and posteriorly by a narrow (one scale wide) light line with a few short interruptions. The southern adults, on the contrary, have no such nuchal markings because the entire neck and anterior part of trunk are solid black (as illustrated by Webb and Baker, 1984: 245). Only the lateral ends of the light line bordering the rear edge of the black collar in northern specimens are evident where they curve dorsal to the arm insertion. Only the adults exhibit this difference; immature specimens are indistinguishable in the two regions. Likewise, no differences in scalation are evident.

Nevertheless, the melanistic pattern of the southern Chihuahua samples occurs pretty much throughout the southern parts of the range of the subspecies, south of Chihuahua, as has long been noted (e.g., Smith, 1938).

Wiens et al. (1999) recognized no subspecies of *S. jarrovii*,

elevating some subspecies previously recognized to species rank, and synonymizing others. The status of *S. lineolateralis* was left in abeyance, but its range was included in the distributional map for *S. jarrovii* of which it was presumably regarded a junior synonym. The two geographic assemblages here noted of *S. j. jarrovii* may or may not merit subspecific recognition.

Sceloporus poinsettii macrolepis Smith and Chrapliwy, Largescale Spiny Lizard. Three specimens were taken. One (JLE 3990) is from km 66, 66 km S Creel, hwy to Guachochi, 25 July. Two (JLE 4023-4) are from Mesa de Agostadero, Cerro Blanco, mpio. Balleza, hwy Guachochi-Balleza (26°54'38.7"N, 106°47'14.1"W), 2356 m, 26 July. All are females, two juveniles and one adult (91 mm S-V), none of which exhibit any evidence of abdominal semeions, although in the series from eastern Chihuahua (following) all 8 females but one, at 81 mm S-V, measuring 67 mm or more S-V have at least faint abdominal semeions. The dorsals are 28, 29 and 31, the femoral pore totals 23, 23, 26.

Sceloporus poinsettii polylepis Smith and Chrapliwy, Small-scale Spiny Lizard. Three specimens are regarded by R. G. Webb (pers. com.) as representative of this subspecies: JLE 3581-2, 3584, Cerro Cañada at La Perla (=El Berrendo) (28°17'59.8"N, 104°33'5.0"W), 1621 m, 4-5 July. Two have 38 dorsals, one 36.

Sceloporus poinsettii poinsettii Baird and Girard × *polylepis* Smith and Chrapliwy, Crevice × Smallscale Spiny Lizard. Twenty-five specimens, as follows, are all regarded as intergrades by R. G. Webb (pers. com.): JLE 3632-3, 3652-3, Polvorillas (=Piedras Encimadas) (28°47'36.2"N, 104°13'30.8"W), 1440 m, 7 July; JLE 4283-9, Cerros Tres Castillos (1.5-2.5 km SW 29°54'41.8"N, 105°42'13.7"W, 1260 m), 31 August; JLE 4301-12, Cerros Santa Anita (29°40'14.1"N, 105°19'13.6"W), 1 September; and JLE 4378, 6 km SE Manuel Benavides (29°5'27.7"N, 103°51'16.3"W), 1060 m, 2 September. The number of dorsals varies 30-37 ($\bar{x}$ =34.9, n=25), with only 40% 36 or more, hence falling more or less in the middle between expectations for *S. p. poinsettii* at 4% and *S. p. polylepis* at 83% (Smith and Chrapliwy, 1958); the localities represented are likewise intermediate in position between the known ranges of the two subspecies. The total femoral pore count varies 18-24 ($\bar{x}$ =20.9, n=25), 40% 20 or fewer, thus tending somewhat toward *S. p. robisoni* of more northwestern areas of the state (Tanner, 1987). All males (5) measuring 62 mm or more S-V have at least faint abdominal semeions, and those at 55 mm or less (5) lack all evidence of them. All females (7) measuring at least 67 mm S-V have at least faint abdominal semeions, with one exception at 81 mm, and all measuring 66 mm or less S-V (9) lack all evidence of them. The largest female measures 104 mm S-V, the largest male 94 mm.

Sceloporus slevini Smith, Slevin's Bunchgrass Lizard. Three females, one lacking pattern and all with a single canthal: JLE 3954, 3961, on bark on ground 8.1 km S Creel, rd to Cabañas Batosarachi (27°42'6.9"W, 107°35'6.1"W), July 23-24; JLE 3991, Mesa del Ejido, E side Guachochi cemetery

(26°49'15.6"N, 107°4'9.7"W), 2238 m, basking on a small rock.

Urosaurus ornatus caeruleus (Smith), Blue Tree Lizard. Twenty-seven specimens were taken. JLE 3583, Cerro La Cañada, outskirts of La Perla (=El Berrendo), mpio. Camargo (28°17'59.8"N, 104°33'5.0"W), 1621 m, 4 July; JLE 3643-7, Polvorillas (=Piedras Encimadas), mpio. Ojinaga (28°47'36.2"N, 104°13'30.8"W), 1440 m, 7 July; JLE 3753-6, Cañon de Pegüis (29°32'1.4"N, 104°47'39.4"W), 10-11 July; JLE 3841, Lomas El Berrendo, km 42 Coyame to Ejido Ojo del Carrizo, 14 July; JLE 4160, Entronque La Perla, 27 August; JLE 4198-4200, 4217, Río San Carlos, Sierra Azul, nr Manuel Benavides (29°6'52.5"N, 103°55'37.6"W), 1200 m, 27-28 August; JLE 4246, betw. Rancho Agua Zarca and Rancho La Bamba (29°58'22.7"N, 105°22'21.1"W), 1550 m, 29 August; JLE 4314, Cerros Santa Anita (29°40'14.1"N, 105°19'13.6"W), 1 September; JLE 4394-4400, 4404, 4406, Puente Nuevo Lajitas, Paso de San Antonio, 6 km SE Manuel Benavides (29°5'27.7"N, 103°51'16.3"W), 1060 m, 4 September.

Tanner (1987) was the first to observe that the range of *U. o. caeruleus* covers most of eastern Chihuahua, rather than being limited to the central part of the state, as was long thought. It now appears likely that only two subspecies of the species occur in the state, the northern border of which is occupied by *U. o. schotti*, to which we provisionally refer Tanner's citation of *U. o. schmidtii* from 3 mi S Samalayuca. His citation of the same subspecies possibly from Chihuahua (7 mi NW Indian Hot Springs, Texas) is problematical.

All of the adult males in the present series exhibit the characteristic blue covering the entire ventral surface of the abdomen, a preanal area, and a gular area; other ventral surfaces of head and body are densely pigmented with black. In addition, the enlarged paravertebral series is reduced on the rump (suprasacral area) to essentially a single row on either side; the lateral of the two rows evident on the trunk is much reduced in size there. On the trunk, the scales of the lateral of the two paravertebral rows of enlarged scales are mostly less than half the size of the scales in the median paravertebral row. The small vertebral rows are mostly in two rows, partly in three.

One of the present series was found on a fence post; all others were on rocks.

Urosaurus ornatus schotti (Baird), Schott's Tree Lizard. Three specimens (JLE 3914-6) are from Sierra San Luis at km 75.1 on the Janos-Agua Prieta hwy (31°19'1.8"N, 108°44'38.5"W), 1670 m, July 20, found on rocks. All are females. The two rows of enlarged paravertebrals are complete on the rump, and of about the same size. On the trunk, the scales of those two rows are of nearly the same size, or those of the outer row somewhat smaller, but generally more than half the size of those in the inner row. The small vertebrals are in one or two rows.

The name *U. o. schotti* and the variation in that taxon and in related taxa were discussed in some detail in Langebartel

and Smith (1954), whose conclusions we follow. Wiens (1993) did not recognize subspecies in *U. ornatus*, but analysis of geographic variation was not the objective of that study, but rather the relationships and phylogeny of the various species of the genus. The differences cited here and elsewhere between the two subspecies of confirmed occurrence in Chihuahua are sufficient to justify recognition of *U. o. schotti* and *U. o. caeruleus* as valid subspecies in the state. Nevertheless geographic variation in the species remains poorly known and in need of comprehensive study.

Uta stansburiana stejnegeri Schmidt, Desert Side-Blotched Lizard. Sixteen specimens were taken, as follows: JLE 3881-3, nr rest stop 11.2 km S Samalayuca km 307.65, Hwy 45, 18

July; JLE 3884, El Mimbres, mpio. Praxedes (31°18'53.8"N, 106°4'32.8"W), 1243 m, 18 July; JLE 3885-6 (a copulating pair), 3887-90, sand dunes nr Rancho Bandejas (31°18'0.3"N, 106°4'50.3"W), 1170 m, 19 July; JLE 4250-5, sand dunes nr La Bamba (30°5'11.7"N, 105°24'30.8"W), 1380 m, 30 August. Although rare in the western part of the state (Tanner, 1987), it is probably the most common and widely distributed species of lizard in the eastern part.

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Bull. Chicago Herp. Soc. 35(8):187, 2000

**Book Review: *Chameleons: Nature's Hidden Jewels* by Petr Nečas
1999. Edition Chimaira, Frankfurt/Main, and Krieger Publishing Co., Malabar, FL. 348 pp.**

**Ilene Sievert
729 Central Street
Evanston, IL 60201**

This book, translated from the 1995 German language edition, will interest both those with particular obsession with chameleons and those who want to round out their knowledge of reptiles with an overview of these unusual animals and their peculiar modifications. The author, Petr Nečas, assumes some prior general acquaintance with reptiles, and especially with lizards, but the language is not above nonscientists. The text is arranged so that one may easily scan over sections of less interest and proceed to others without confusion.

The first main section, which Nečas calls "General Section," contains material on systematics, evolutionary origins, biology, place in human culture, and a brief discussion of topics related to husbandry.

The second section, "Special Section," will attract the chameleon keeper with pictures and descriptions of individual species, though not of every known type. For instance, there is a photograph of *Rhampholeon brevicaudatus* but there is no discussion of this species among the *Rhampholeons*.

The main sections are followed by an appendix including a list of living and fossil species with location data, a handy chart of living species with keys to habitat type, vegetation of habitat, parity (oviparous or ovoviviparous), and sizes of the species. There is a list of valid and described taxa with synonyms and errors. There is a thick bibliography, an index of figures and a short glossary. I missed an index in the back that would list every page where there is a mention of a particular species or subject, not only in its primary discussion, but all comparisons, examples, or passing reference.

Nečas is methodical and well organized. If one were interested in the chameleon's head decoration, one would turn to the General Section, Biology of chameleons, Head. Under "Head" one would find a short description of crest and a listing of different types of cranial protuberances with examples of species having the respective types and illustrations. Further, there are listings of variations of the major types by species, how many horns, type of crest or casque, and finally a list of functions for these decorations with a discussion of the variations of head ornament in syntopic species. Along with "typical" biological descriptions, variation is noted among species and even individuals.

Throughout this book there are photographs and detailed drawings illustrating features of anatomy. Schematic drawings show features of tongue protrusion and water drinking.

In the husbandry section, "Keeping Chameleons in Terrariums," Nečas does not preach but makes it quite clear these are not animals for those inexperienced with problematic species of lizard. He gives a reasoned explanation of the advantages of captive-bred animals over wild-caught and the ethics of maintaining chameleons in the environment suitable for the individual species. Suitable size of habitat, ventilation, temperature, humidity, light intensity: all may differ from one species to another. Methods of achieving the proper environmental conditions are suggested. If you wanted to keep, say, Jackson's chameleon, having general knowledge of chameleons, look in the Special Section under Genus *Chamaeleo*, Subgenus *Trioceros*, *Ch. (T.) jacksonii*. There you would find that it is from humid montane conditions, with maximum and minimum temperatures for day and night, that it may be kept in pairs, needs a large screened habitat, and so on with details of life history. Then you can check back to the terrarium section for methods of sizing and outfitting the cage.

He provides a checklist for evaluating the animal you are considering with the warning that even if all the signs of health and youth are present there may still be problems requiring treatment. The section on health is a guide to chameleon disorders that will aid in evaluation and facilitate discussion of treatment with your veterinarian. Or, if you are accustomed to doing your own health work you will get pointers to areas of susceptibility and medications that have been used. Especially important for the hobbyist is knowledge of disorders caused by improper husbandry.

I appreciate the methodical and matter-of-fact approach to this subject, too often handled anecdotally and often hit-or-miss on species individuation. Although there are many pictures in this book, it is an information source, not a picture book. It can be a starting point on a further study of terrarium design, or literature search on species, history of chameleon studies, or other chameleon topics. It's the most useful and interesting general book I've seen on the topic of chameleons.

The Tympanum

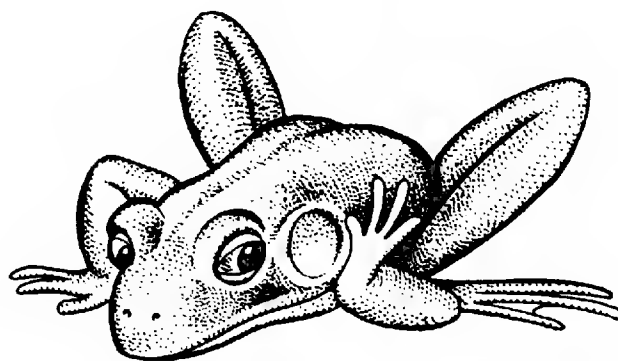
Donald G. Wheeler
2705 Sunset Trail
Riverwoods IL 60015

Dear Don:

Your cartoon in the April issue of the *Bulletin of the Chicago Herpetological Society* is, in my opinion, the cleverest you ever drew. Humanity gets all the privileges and wildlife inherits all the sewage to fill up what used to be its habitat. You have captured what is happening all over the world. Scarcely a week goes by when I don't learn about another animal that is in trouble. . . .

My hearty congratulations to you.

Sincerely yours, **Roger Conant, Adjunct Professor, Department of Biology, University of New Mexico.**



North Dakota State University Reptile Collection Downsized

The venomous snakes in the reptile collection at NDSU have been removed. The action was precipitated by a recent bite, but there were also two other major factors.

I was accidentally bitten July 11, 2000, while doing a relatively routine procedure that I have done dozens of times over many years, removing some unshed skin ("eyecaps") from a large (5½ foot) Indian spectacled cobra (*Naja naja*). We followed our protocol in case of a bite, used antivenom, and everything worked as it was supposed to. I had enough symptoms of envenomation that it was clear I did not have a dry bite. I was out of the hospital in 24 hours and fully recovered, almost as if it hadn't even happened.

After the bite occurred, I finished the job of removing the eyecaps, which only required a few more seconds, and put the snake back in its cage. I then got the antivenom out of the refrigerator and had the two students who were helping me drive me to the emergency room. I was doing the eyecap job with an Optivisor (a magnifying visor worn on the head) plus forceps etc., and noticed that my hand shook briefly while I was finishing the job, but I otherwise didn't have any anxiety or nervousness—just concern and the realization of what had happened and that we had to follow procedures. After getting out of the hospital, I had no apprehension about working with such animals and could have kept doing so, as I did several years ago following a serious bite from a copperhead (in which case I had both extensive local and systemic effects but deliberately didn't use antivenom because we [the consulting doctors and I] didn't consider it life threatening and I wanted to avoid serum problems that can occur with antivenom, in case I might need antivenom in a future more serious bite—so I just rode that one out).

However, I have now had antivenom. A future bite and use of antivenom could become more problematic. It wasn't worth the potential hassle to me; and the university administration didn't want the risk or expense (treating venomous bites is not cheap!)

Two other problems involve my frequently being out of town with no one else at the university being able to care for the venomous species while I am gone and problems with flooding (the collection is housed in a basement room). We used to use trained students to care for the venomous species when I was gone for extensive periods, but the administration became concerned about liability and stopped that a couple years ago. Regarding flooding, the latest flood in June only resulted in 5 inches of water in the room with the snakes. But, depending on conditions, it easily could have been more (the library was flooded 4 to 6 feet deep and the local FargoDome got 12 feet!) and it could easily happen in the future (Fargo has now had three major floods in the past seven years). No one wants to contemplate a flooded room with venomous snakes, particular-

A number of years ago, I came to one of your . . . [CHS] meetings (I was visiting relatives downstate) and talked about the Kemp's ridley sea turtles.

We have a great opportunity in Texas to reduce shrimping, cut down bycatch which is the needless death of tons of fish and marine organisms caught in nets with shrimp and we can save sea turtles from the horror of drowning in shrimp trawls. I would like to get this message to everyone who could send an E-mail to support the Texas Parks and Wildlife (TPW) shrimp management plan which is now in the public hearing stage. Since sea turtles are all either endangered or threatened, everyone in the entire U.S. should be speaking up about more protection for them even though some might think it's a state issue.

I founded Help Endangered Animals—Ridley Turtles (HEART) 18 years ago to prevent the extinction of the Kemp's ridley sea turtle. This is the first time in all those years that the state is trying to implement regulations that will help the sea turtles as part of a conservation plan to actually help the shrimpers. Full details about the TPW plan are on my website: ridleyturtles.org, which has a direct link to their website.

Their management plan will take steps to prevent the collapse of the shrimp fishery from overfishing, reduce the wasteful bycatch of marine animals killed in shrimp nets during the catching/sort process and it would provide a zone in south Texas waters prohibiting shrimping from the land out 5 miles. This measure would help sea turtles that migrate along the coast, especially the Kemp's ridley sea turtles. Of course, the shrimp industry opposes any conservation plan that would impact them in the slightest way. The Lone Star Sierra Club, the Environmental Defense Fund, Sea Turtle Restoration Project and the Humane Society of the United States favor the plan. Can you help us? Thanks.

Carole Allen, E-mail: challen@flash.net

ly if it were to break out windows or doors (as it has done in some buildings) and also break open cages that might be floating around!

Thus, the decision was made to remove all of the venomous species. They were sent to Reptile Gardens (from where many of them were on loan). We had 26 of them, of many kinds from all over the world. (We currently still have around 30 nonvenomous ones plus a few turtles and lizards etc.)

I have worked with venomous snakes off and on for 38 years and have had them at NDSU for the entire 27 years that I have been here. They were a real hit with students and a major attraction for many visitors. Thus, their absence is going to take some getting used to. Oh well. One positive aspect is that it will help free up some of my time.

I might eventually write a report on the details of the bite and treatment for interested persons; let me know if you want a copy, by E-mail <james_grier@ndsu.nodak.edu>. In the meantime, however, one of the most important lessons learned was a reinforcement of the need to (1) have antivenom on hand for any venomous species that one might be working with and (2) have a prepared, written emergency protocol and follow it. We did that and I am convinced it is the reason I am alive while others have died. In fact, a sibling of the cobra that bit me killed another person a few years ago. I don't have the full details of that case but recall that the person didn't have anti-venom and/or apparently took the bite less seriously and delayed getting medical attention. One of the most surprising things to me about both of the bites I received (this one plus the earlier copperhead bite) is how little pain or feeling there was with the actual bite itself, just a quick, light prick. Some bites from harmless snakes hurt more. And the feeling is not like one might imagine from a shot from a hypodermic syringe or from a blood lance. It would be easy to not take a venomous bite seriously. However, the effects that follow the initial bite (including local pain with some species) can be something else! **James W. Grier, Department of Zoology, North Dakota State University, Fargo ND 58105-5517.**

Dear Editor,

Thanks for publishing Dean Ripa's "Degenerated Science" in the May *Bulletin*. Mr. Ripa gave an excellent account of the extent of the live reptile trade and its true impact upon reptile populations. I should have realized that the uproar over the commercial reptile trade was "much ado about nothing" when I visited the two largest reptile dealers in the country, Glades Herp and Herpetofauna, in the mid-nineties. Both of their operations were housed in old convenience store buildings.

Although it's now obvious after having read the article, I didn't realize the deadly effect over time of highways upon reptile populations. I've traveled regularly for 21 years over a two-lane road through Merritt Island Wildlife Sanctuary and I wondered why I now see fewer herps than at the beginning of that period. Perhaps the some of the government agencies which own the roads could be persuaded to install technological solutions such as barriers and passage pipes.

I keep and breed *Crotalus adamanteus*. This species is often called "endangered" by the politically correct although the market price of my "rare" babies is so low that it doesn't cover the food bill for the colony. Two years ago a herper friend of mine from Tallahassee declared that he thought the animal might be extinct in his area of the state because he hadn't seen one in a while. Later that year he found three in one month on the roads there just in the course of his normal travel. As Mr. Ripa points out, the fact that one can't just go out and find a specimen at will does not mean that a snake species is not present or even common on the land.

I learned a great deal from this article concerning the true causes of reptile peril and about the ecology of some of my favorite species. I've derived considerable insight from Mr. Ripa's past articles, especially the one on the bushmasters in which he very generously detailed the protocols which enable his consistent success in breeding these difficult species. I look forward to more of his writings.

**Martin Nelson, 818 E. 19th Avenue,
New Smyrna Beach FL 32169 <mnelson@atlantic.net>**

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HerPET-POURRI

by Ellin Beltz

Researchers claim birds are not dinosaurs

In yet another paper in the ongoing debate about the origin of birds, study of one 220-million-year-old fossil has caused some scientists to claim that birds arose independently from reptiles, not from dinosaurs. The fossil is 75 million years older than the oldest known bird. It reportedly has feathers that may have been used to glide. The researcher who studied the creature, *Longisquama insignis*, said "Its skeleton also looks like a bird, although the creature may have been lizardlike and lived in trees. Its frill . . . made up of 6 to 8 pairs of feathers, acted to help it glide. . . . And it has a wishbone, a shoulder structure seen in birds. It may have been able to use its arms

as a steering apparatus." He compared it to small flying dragons found in parts of Southeast Asia. The fossil was found more than 30 years ago in central Asia by a Russian paleontologist specializing in insects. It toured the U.S. in the 90s, where the researchers saw it first in a shopping mall exhibit. [All quotes from *Reuters*, June 22, 2000, from Marco Mendez]

New book on Chicago River

Lake Claremont Press has just released *The Chicago River: A Natural and Unnatural History* by Libby Hill. Libby is not only an exceptional person in Chicago natural history, but one

of the few people to see a massasauga rattlesnake in the wild. For information about the book and how to get it, contact Sharon Woodhouse, (773) 583-7800 <sharon@lakeclaremont.com>, or visit their website <www.lakeclaremont.com>.

Judge rules in favor of sea turtles

“I am passing along this great news for turtles, . . . with a caution not to be openly pleased about this decision around certain people [in] the State of Hawaii. . . . Judge Ezra in Hawaii has reached a final decision on his order as a response to our joint lawsuit to reduce the harm to leatherback and other sea turtles from the longlining fishery. . . . [Specifically] • Closed to longlining year round—30 degrees north to 44 degrees north and 137 degrees west to 173 degrees east. We had asked for year-round closure of all water north of 29 degrees north, so this is very close to our request. • Closed during April and May—6 degrees north to 30 degrees north and 137 degrees west to 173 degrees east (Area A). We had asked for closure of these waters from April through July, two additional months. • During the remaining 10 months of the year, only 636 longline sets will be allowed to occur in Area A. This is much less fishing than the 13,000 sets which occurred in this area last year. . . .” [This issue was also covered by the *Chicago Tribune*, July 16, 2000, from Ray Boldt]

Tick, tick, tick

“Good news! The interim USDA rule to allow the interstate movement of the leopard, African spurred, and Bell’s hingeback tortoises was effective July 17 and will be published in the Federal Register this July 21. Here is language from the interim rule to explain what became effective: We are allowing the interstate movement of leopard tortoise, African spurred tortoise, and Bell’s hingeback tortoise if the tortoises are accompanied by a health certificate signed by a Federal or accredited veterinarian stating that the tortoises have been examined by that veterinarian and found free of ticks. The certification will help ensure that the interstate movement of these tortoises will pose no risk of spreading exotic ticks. This action is warranted to enable the export, interstate commerce, health care, and adoption of these types of tortoises while providing protection against the spread of exotic ticks known to be vectors of heartwater disease. For more information contact <Dave.D.Wilson@usda.gov>.” [from *kingsnake.com NEWSFLASH*, July 20, 2000]

Vegetarian crocodiles?

“New evidence challenges the idea that crocodiles are ‘living fossils,’ surviving virtually unchanged while organisms around them become extinct or evolved beyond recognition. . . [says] a researcher at Roosevelt University, Illinois, and colleagues, of a fossilized ‘pug-nosed’ crocodile found in Madagascar and dating back to the Late Cretaceous (97-65 million years ago). The researchers describe the fossil as ‘an exquisitely preserved specimen’ and have named it *Simosuchus clarki* (from the Greek simos or pug-nosed and souchos, the Egyptian crocodile-headed god). Whereas other ‘crocodyliforms’ have an elongated snout with an array of conical teeth, a flattened head, and jaw which gives them a powerful bite, *Simosuchus clarki* is different. It has a short stubby snout, a rounded head,

a jaw with little mobility apart from opening and closing, and cloven-shaped teeth suggesting that it may even have offended the ‘crocodile’ norm even more by being a herbivore. This new find shares several features with another Late Cretaceous crocodile found in Uruguay... [and] supports the biogeographical hypothesis that Madagascar and South America were linked during the Late Cretaceous.” [Australian Broadcasting Corporation, June 26, 2000, from Wes von Papineau]

Range extension

A juvenile American alligator was found in suburban Middletown, New Jersey, by animal control officers who collected the three-foot-long critter off a lawn. The township is trying to find an out-of-New Jersey home for the animal; probably the kindest thing—if you’ve ever had to live there, you’d know. [*The Morning Call*, July 22, 2000, from Ribello Berton of an adjoining state]

Species recovery or discovery?

“A rare community of green and golden bell frogs has been saved from a gas pipeline digging operation in New South Wales, Australia. The frogs, which have become the unofficial mascot of the Sydney Olympic games, were found during an ecological assessment along the proposed extension of a gas pipeline out of Canberra. [An] ecologist said that while discovering any endangered species in any area created excitement, finding this particular population of the frog was particularly significant. The population is of a mixed age and was found in the Southern Tablelands. The frog was thought to have disappeared from the area, the last sighting made in 1981. ‘Rediscovering this species gives hope to wildlife managers that other remnant green and golden bell frog populations may exist in the tablelands, and that the populations found may be resistant to some of the diseases that have been attributed to their decline,’ he said. The company conducting the assessment . . . said it would review the proposed route of the pipeline to avoid the area, and said it would use low impact construction techniques if there was a need to pass close to the habitat. [Australian Broadcasting Corporation, April 5, 2000, from Wes von Papineau]

Gettin’ more horny down in Texas

“Wildlife experts call it a Texas horned lizard. College football fans call it a horned frog. Kids, the primary observers of the species until it vanished from North Texas, about 1980, always called it a hornytoad. Whatever its name, we were sure we could call Texas’ most popular reptile a surefire goner. This news flash from West Texas: The hornytoad might be making a comeback. Given up for lost, written off as a helpless victim starved into extinction by chemical pesticides, the Texas horned lizard is proving tougher than we thought. The little horned devil is turning up in larger numbers out west between Lubbock and Wichita Falls, particularly near Childress and Paducah, a Texas Parks and Wildlife district biologist said this week. . . . As any native will tell you—probably often—hornytoads lived in North Texas yards until their favorite food, the large red ant, was wiped out by a one-two punch. . . . Chemical ant poisons left the hornytoad no choice but to move out of neighborhoods. Then, invading

fire ants killed off red ants in the countryside.” [Fort Worth Star-Telegram, July 15, 2000, from Wes von Papineäu]

On the other gill

“Tiger salamanders are dying off in Stutsman County [North Dakota] at an alarming rate, puzzling researchers who are worried about the effect on other wildlife. . . .” Researchers who had previously captured and released 150 to 200 pounds of salamander per trap reported finding none at all on July 13, a first for the area and speculate a virus is to blame. “In May, researchers noticed that some salamanders in the wetlands had discolored skin . . . [according to a] wildlife biologist with the Jamestown research center. ‘In June, we started finding dead ones in the traps. . . . The lesions tend to start up behind the head . . . the skin just basically falls off . . . their livers are also enlarged . . . [and enlarged] spleens, which is consistent to fighting off some kind of infection.’” The wetlands have been studied since 1967 and the salamanders in particular for about a decade. [All quotes from the *Jamestown Sun*, July 24, 2000, from new contributors Russell and Angie Keys.]

Deadly blaze down under

“About 1,000 rare and exotic creatures perished in a \$1 million blaze at one of Australia’s most popular tourist parks yesterday. The priceless crocodiles, snakes, lizards, frogs, turtles and platypuses were killed in the fire at the Australian Reptile Park and Wildlife Sanctuary on the Central Coast. Only two small turtles were rescued, one from the smoldering ashes by a firefighter, the other from a nearby water tank. Devastated staff, who have spent years collecting the rare animals, underwent grief counseling as busloads of tourists were turned back from the gutted building, at Somersby off the Sydney-to-Newcastle Freeway. The 50-year-old park has won many awards, including 1998 Best Regional Tourist Attraction in Australia. It is also home to Australia’s leading snake and spider venom milking station, which is responsible for saving 300 lives every year. The New South Wales Fire Brigades said flames ripped through the building’s animal and breeding enclosures and offices about 12:15 A.M. The blaze, which took 50 firefighters three hours to bring under control, was not being treated as suspicious. . . .” [Sydney Morning Herald, July 17, 2000] Damages are estimated at more than \$1 million U.S. The *Illawarra Mercury* of Wollongong, Australia, reported on July 18, that an electrical fault near the goanna tank caused the fire. [both from Wes von Papineäu; this story was also reported in a short note in the *Chicago Tribune*, July 17, 2000, from Ray Boldt.]

News to them?

The Australian Customs Service says drug dealers are increasingly turning to smuggling native fauna overseas. The service today launched a campaign to counter the illegal trade, following an upsurge in smuggling, particularly in reptiles. The South Australian regional director, Richard Janeczko, says drug dealers are finding that smuggling native fauna can be equally as lucrative as the drug trade. He says some of the creatures involved are endangered, with Europe, Japan and the United States providing the main markets. [Australian Broadcasting Corporation, March 23, 2000, from Wes von Papineäu]

Can’t we just run out a water truck?

“Two dry winters have prevented the Mississippi dusky gopher frog from breeding in its only known habitat, an ephemeral pond adjacent to a proposed residential mega-development, and now biologists are warning that it has become ‘one of the most endangered amphibians in North America. . . .’ The frog’s pond is on Forest Service land but its close proximity to a major development has prompted the Forest Service to look at ‘a land swap or other ways to get a larger buffer around the precious pond.’” [GreenLines, July 25, 2000, <www.stopextinction.org>]

Military correctness

Commander Salamander, Newt-exceptional, inspiration for <kingsnake.com>, long time contributor to this column, other columns and the CHS website, sent the following before his employer (an inadvertent supporter of herpetology) shipped him off to points unknown for months unknown. Enjoy! “Differential Theory of U.S. Armed Forces upon encountering a snake in the Area of Operations [AO]: ● *Infantry*: Snake smells them, leaves area. ● *Airborne*: Lands on and kills the snake. ● *Armor*: Runs over snake, laughs, and looks for more snakes. ● *Aviation*: Has Global Positioning Satellite coordinates to snake. Can’t find snake. Returns to base for refuel, crew rest and manicure. ● *Ranger*: Plays with snake, then eats it. ● *Field Artillery*: Kills snake with massive Time-On-Target barrage with three Forward Artillery Brigades in support. Kills several hundred civilians as unavoidable collateral damage. Mission is considered a success and all participants (including cooks, mechanics and clerks) are awarded Silver Stars. ● *Special Forces*: Makes contact with snake, ignores all State Department directives and Theater Commander Rules of Engagement by building rapport with snake and winning its heart and mind. Trains it to kill other snakes. Files enormous travel settlement upon return. ● *Combat Engineer*: Studies snake. Prepares in-depth doctrinal thesis in obscure 5 series Field Manual about how to defeat snake using counter-mobility assets. Complains that manoeuvre forces don’t understand how to properly conduct doctrinal counter-snake ops. ● *Navy SEAL*: Expendes all ammunition and calls for naval gunfire support in failed attempt to kill snake. Snake bites SEAL and retreats to safety. Hollywood makes fantasy film in which SEALs kill Muslim extremist snakes. ● *Navy*: Fires off 50 cruise missiles from various types of ships, kills snake and makes presentation to Senate Appropriations Committee on how Naval forces are the most cost-effective means of anti-snake force projection. ● *Marine*: Kills snake by accident while looking for souvenirs. Local civilians demand removal of all U.S. forces from the A.O. ● *Marine Recon*: Follows snake, gets lost. ● *Combat Controllers*: Guides snake elsewhere. ● *Para-Rescue Jumper*: Wounds snake in initial encounter, then works feverishly to save snake’s life. ● *Supply*: All anti-snake equipment is on back order. ● *Transport Pilot*: Receives call for anti-snake equipment, delivers two weeks after due date. ● *F-15 Pilot*: Misidentifies snake as enemy Mil-24 Hind helicopter and engages with missiles. Crew chief paints snake kill on aircraft. ● *F-16 Pilot*: Finds snake, drops two CBU-87 cluster bombs, and misses snake target, but gets direct hit on an embassy 100 kilometers east of snake due to

weather conditions which may include: Too Hot also Too Cold, Clear but Too Overcast, Too Dry with Rain, and/or Unlimited Ceiling with Low Cloud Cover. Claims that purchasing multi-million dollar, high-tech snake-killing device will enable it in the future to kill all snakes and achieve a revolution in military affairs. • *AH-64 Apache pilot*: Unable to locate snake, snakes don't show well on infrared. Infrared only operable in desert AOs without power lines or SAMs. • *UH-60 Blackhawk Pilot*: Finds snake on fourth pass after snake builds bonfire, pops smoke, lays out VS 17 to mark Landing Zone. Rotor wash blows snake into fire. • *B-52 Pilot*: Pulls ARCLIGHT mission on snake, kills snake and every other living thing within two miles of target. • *Missile Crew*: Lays in target coordinates to snake in 20 seconds, but can't receive authorization from National Command Authority to use nuclear weapons. • *Intelligence Officer*: Snake? What snake? Only four of 35 indicators of snake activity are currently active. We assess the potential for snake activity as LOW. • *Judge Advocate General (aka military lawyers)*: Snake declines to bite, citing grounds of professional courtesy.

Unfortunately, not funny

A 26-year-old New Jersey man was bitten by a four-foot-long

rattlesnake. Witnesses said he been "fooling with the snake for 45 minutes and picked it up with his bare hands. After allowing people to touch the snake, he was bitten as he attempted to release it. . . . The snake was calm at first, but became agitated as time passed." The man was one of about 65 people in an Appalachian mountain club's wilderness awareness school, but camp officials were away when he was bitten. He was transported to the hospital where his condition was not released. [*The Morning Call*, July 22, 2000, from Ribello Bertoni]

Thanks to everyone who contributed this month!

And to Bill Burnett, Ray Boldt, Jim and Kathy Bricker, the folks at *FrogLog*, Marty Marcus, Alan Rigerman, Ernie Liner, Ribello Bertoni, Eloise Beltz-Decker, and the New Zealand Herpetological Society for things they sent which I'm saving for next time or couldn't figure out how to summarize right now. You can contribute, too! Take whole pages of newspaper and magazines containing articles of interest and mail to: Ellin Beltz, 1647 N. Clybourn, Chicago, IL 60614-5507. Be sure your name is on each piece, it can get quite confusing here on "column writing day."

Unofficial Minutes of the CHS Board Meeting, July 14, 2000

The meeting was called to order by Jack Schoenfelder at 7:37 P.M. Board members Karen Bielski, Rich Crowley, Linda Malawy, Marcia Rybak, Steve Spitzer and Jenny Vollman were absent.

Officers' Reports

The official minutes of the June 2000 Board of Directors' Meeting were read by Michael Dloogatch. Corrections were made and the minutes were accepted.

The Treasurer's report was read by Gary Fogel and accepted, with Gary's correction that \$2009 listed as a membership expense should actually be listed under *Bulletin* printing. The year to date income for 2000 is about on par with that of 1999. Mike reported that there was a review of the financial records and no irregularities were found.

Membership Secretary Mike Dloogatch reported that relatively few memberships came up for renewal in June, which will result in a net gain of members next month, but we should anticipate more declines in the coming months. Membership for July stands at 824, down from 860 in January.

Vice-President Lori King announced a change in the speaker roster. Mike Wood, who was to speak in August, will present in January 2001 instead. The speaker for next month will be Jake Socha, a CHS 2000 grant recipient from the University of Chicago. He has been studying the "flying snakes" of Southeast Asia. He is very enthusiastic about talking to us about his research on *Chrysopelea*.

Corresponding Secretary Steve Spitzer was absent. He sent a report indicating that he is in the process of dividing the outgoing phone message. He also requested an allocation of no more than \$100 for the CHS picnic in order to purchase the County permit, soft drinks and prizes for the turtle races. The board enthusiastically approved the expense.

Publications Secretary Marcia Rybak was absent. She sent a report which included a request that someone else take over the management of the website. Since the current website has an established structure, Mike Dloogatch observed that even someone who is not very experienced with establishing/maintaining websites could take over this task. Marcia will be happy to provide assistance. Jack stated that he would announce this opportunity to volunteer at the next general meeting. This led to a discussion of the role of the Publications Secretary. (According to the bylaws, the secretary is responsible for all publications as directed by the President or the Board of Directors. The Secretary may act as the Editor for any publication or may appoint editors subject to Board approval.) Mike stated that historically the editorship of the *Bulletin*, which comes under the responsibilities of the secretary, has effectively been an autonomous function. The editor of the *Bulletin* wasn't made a Board position because it was viewed as a perennial position. The Publications Secretary was then created as a Board position. Ron Humbert wondered if the job description of the secretary should be changed, and Greg Brim thought that perhaps there could be a separate job as Webmaster. Mike postulated that we could make the Webmaster into a perennial position and we could also con-

sider putting people in perennial positions on the Board. Jack Schoenfelder wondered if the website management automatically fell under the supervision of the Secretary if it was delegated by the Board to someone else. This led to a brief discussion about the size of the Board. Jack suggested that, for now, we leave the constitution of the Board unchanged and the description of the Board members' responsibilities unchanged as well. Greg Brim said he is familiar with the technical aspects of the web maintenance but the actual generation of content (the writing) is something he doesn't routinely do. Depending on what the webmaster wishes to accomplish, the total job can take up from a few hours to 40 hours or more a week. Char Haguewood offered to assist at least during the transition, however, she does not have 24/7 access to the computer systems required. Jack stated he would check out the pricing for the hardware, software and internet connections. Ron offered to speak to CHS member Chris Lechowicz, who has been interested in establishing a Southern Illinois chapter of the CHS and who is also a computer science major, about whether he might wish to take up the position. Jack supported this and Char agreed to act as a back-up person. Temporarily, Marcia will continue maintaining the website. Mike mentioned that Network Systems will send us a bill for our domain name of \$35/year for a June 2000 to June 2001. Char mentioned the need for the Board as a whole, in addition to the webmaster, having the logon and password for the site. There was a succinct dispute between Mike and Char about the risk/benefit ratio of requesting volunteers from those whom one does not know personally. Jack resolved this by the plan to invite any volunteers to attend the board meeting as he has done with members who expressed an interest in taking charge of the Library and Reptilefest.

Standing Committees

Grants: The committee reconvenes in August or September. All checks but one from the 2000 Grants have been cashed.

Shows: Jenny Vollman was absent. She sent a report that the plans for the Gurnee Mills Breeders Show next week are in place. Jenny is working with Nicole Royale from the CAS regarding plans for the Labor Day Herpetological Weekend and she is actively recruiting volunteers. Any member who wishes to be involved is requested to contact Jenny as soon as possible. Ron Humbert predicted we can expect a call to attend the Willowbrook Nature Center Show in Itasca.

Raffles: Gary Kostka reported that the raffle continues to go very well. Marcia Rybak may not be procuring items for the raffles, however, there are enough items for the next year. Gary announced that he is planning to resign from running the raffle. He would like to continue to be in charge of the raffle through the June 2001 general meeting. Our goal has been to earn \$85/month and we are exceeding that goal this year.

Library: Jack reported that he and Jeff Janovetz have met to discuss some ideas about the direction of the library. Jeff would like to run the library, currently stored in Gary Fogel's basement. Jack opened the floor to ideas about how to do this given the lack of storage space at the CAS. Gary suggested that Jeff categorize the books any way he thinks is workable

for him, make a list and bring it to the general meetings for members to look over. They could make requests for books which could then be brought to the next meeting for checkout. Jeff Janovetz stated that he is an employee of the Field Museum and that he can get the same storage area for the books that the CHS had when we were meeting there. He felt that he would be able to transport the books to the CAS for the meeting, although he would need to make some provisions for a different cart since the one last used would probably not be able to be carried back and forth. Lori King and Joan Moore believed that Joel, the head of maintenance for the CAS, would assist us in locating some space following the museum's accreditation. Mike supported the idea, pointing out that we actually need only a very small space to which not many people have access. Lori suggested we include the space issue as a matter of great importance to us in our renegotiation of the contract. Jack suggested this would be a good time for the members to take up other CAS related issues. The day after the last general meeting, Jack received a call from a museum representative since he had expressed concerns to one of the AV people from the CAS who said he would bring up Jack's problems with the facility arrangements for the meetings. Jack mentioned problems with the AV equipment but especially with the parking problems. We had an understanding that we would have free use of the parking facility after 7 P.M. We are now being told that while the zoo is open in the evenings during the summer months, we will have to pay for parking in the lot. Another lot which we thought would be available also is closed to us. The position of the museum rep was that they had no control over the parking charges. Jack contended that we have proved we are good tenants and have much to add to the CAS. He asserted that in our next contract negotiations he would hope that we could get a reduction in our rate to reimburse people for parking fees. Joan Moore mentioned that Joel said we can use the driveway to park; the grassy area near the loading dock which is hidden from street view is also a possibility. Mike came back to the storage issue for books. The museum has a great deal of floor space. Perhaps a simple locking cart could be set aside in a hall. In spite of this discussion, Jeff Janovetz still agreed to be the new librarian and is prepared to use the Field Museum storage. Joan Moore said she would be glad to have some real books present as a way of bringing members together in conversation. Mike encouraged Jeff to bring any requests for books to be purchased to the Board since we have some money available for new books, and can use Amazon.com to reduce the money actually spent. Lori King mentioned that we can look forward to an increased alliance with the CAS as they become progressively more aware of our presence and their ability to use this to support their own connections within the community.

ReptileFest: Darin Croft expressed his interest in becoming involved in running ReptileFest. Jack suggested that Darin meet with Lori King and Gary Fogel to discuss this. Mike mentioned that the biggest job is finding a new site, but that everyone involved in the 'Fest knows their roles and Lori and Gary will be there to help. Ron Humbert reiterated his commitment to looking into two possible sites: Elmhurst College and Riverside/Brookfield High School.

Ad Hoc Committees

CAS: Regarding the Labor Day Herpetological Weekend, Jenny is using the information learned from the Corporate Family Day to prepare a firm listing of our requirements. Gary is discussing with Nicole Royale how videotapes of our general meeting speakers can be used. Mike commented that Joan Moore had done a great job of getting people to exhibit at the Corporate Family Day. Thirty out of 31 committed exhibitors showed up. Jack said that such success is secondary to the nature of the leadership. Joan wished to express her personal thanks to each of the following presenters for the time, the care, and the quality they put into their exhibitions for Corporate Family Day: Bob Bavirsha; Dan Bavirsha; Karen Bielski; Aaron Corbit; Rich Crowley; Nick d'Andrea; Mike Dloogatch; Gary Fogel; Emily Forcade; Will Forcade; Sally Hajek; Dottie Humbert; Ron Humbert; Jon Ihrig; Jeff Janovetz; Lori King; Gary Kostka; John Kostka; Alan Loague; Linda Malawy; Jaime McInerney; Joan Moore; Matt Morris; Steve Quint; Mike Scott; Ilene Sievert; Steve Spitzer; Jenny Vollman; Lisa Yerian.

Jack noted in the Public Programs Catalogue for the CAS that there was no mention of our monthly meetings. He will address this with their administration. Mike said that the most recent catalogue did have a listing for the Herp Weekend. Gary Kostka mentioned that many people who attended the recent Family Day assumed we worked for the CAS and were very surprised that we were private owners of the animals. Many people said they wished we were a permanent exhibit. It will take more time and recognition for us to be identified as the quality program we are.

Nominating 2000: Ron Humbert said he would like to present at the August general meeting how the Nominating Committee works. He would then like to open the floor to nominations at each meeting until the election. The slate produced by the committee is announced in September and is printed in the October *Bulletin*. The committee has agreed not to put any of themselves on the slate. Jack reminded the group of Robert's Rules of Order; i.e., not to eliminate the possibility of nominating quality candidates who are serving on the committee.

Awards: The committee chairman, Greg Brim, and the committee members, the Board Members-at-large, will convene in August.

Symposium 2001: Char reported with some regret that after sending a proposal to the Chicago Convention Bureau, which sends this to numerous facilities, she has only received two proposals from convention facilities. The Radisson in Rosemont and the Holiday Inn in Tinley Park. The latter is still under construction. She has an appointment to view this space on July 21 and welcomes anyone who wishes to join her. Several other places looked good but are booked for October. Some others couldn't discuss the reservation because it was too far ahead. Many places don't open their calendar more than 11 months into the future. By the 2000 Kansas City Symposium, we may not have a date or location to announce. We have several speakers who are committed to attend even without a known date up front.

Old Business

Marketing Package: Char Haguewood presented a mockup of a document we can consider to use as a marketing package to elicit sponsorships when we have shows or other special opportunities. She requested that the group review it and present ideas regarding content as well as supplemental information which could be added. Jack strongly supported the need for press packets to be immediately available to get money from sponsors when the opportunity arises. Lori King said she is researching how to obtain high level sponsorships in relation to the Utila Island Conservation Project and that the subject is extremely complicated. Part of what is involved is developing relationships with people you need money from. Since we are a 501(c)(3) organization, we would be looking for sponsors who are also benefitting from a tax write-off. Joan Moore mentioned that we are looking at two separate goals, financing and publicity. We would do well to send notices to all free publications that have calendars.

New Business

Joan Moore was contacted by the Chicago Botanical Garden asking if we can help them reintroduce some native herps. Mike suggested putting them in touch with Rob Carmichael, who is working on a similar project in Lake County.

Animal of the Month / Short: Jack suggested we plan to start each general meeting at 7:30 P.M. due to real time problems that prevent people from arriving earlier. He would like to use the 7– 7:30 P.M. period to do a short on the Animal of the Month. Joan wondered if we could publicize this ahead in the *Bulletin* as a draw. Would Lisa Yerian consider doing a Short on zoonoses? Lisa will check her schedule about the possibility of doing this for the September meeting. Darin Croft suggested that this time period would be a good opportunity to present basic information for people who are novices.

Show and Tell: The last program was very well received, but accommodations of the AV equipment for children are necessary to allow them to speak from the floor and be heard.

Jack received a publication from the Chicago Wilderness organization which includes listings of many nature-related groups, but not the CHS. He raised the idea of joining so we can be listed. CHS member Mike Redmer is involved with this organization. Jack will contact him for information.

Round Table

Gary Kostka presented kudos to Joan Moore for the great show last week.

Lisa Yerian expressed her appreciation for the personal invitations to the Board meeting which were extended by Jack. She also emphasized her impression that the CAS had a valuable commodity in their association with our organization which she hoped they would come to fully appreciate.

The meeting adjourned at 9:43 P.M.

Respectfully submitted by Emily Forcade for Recording Secretary Karen Bielski.

Herpetology 2000

In this column the editorial staff presents short abstracts of herpetological articles we have found of interest. This is not an attempt to summarize all of the research papers being published; it is an attempt to increase the reader's awareness of what herpetologists have been doing and publishing. The editor assumes full responsibility for any errors or misleading statements.

LIZARD-PLANT INTERACTIONS

V. Pérez-Mellado et al. [2000, Amphibia-Reptilia 21(2): 223-226] observed foraging behavior of the Balearic lizard *Podarcis l. lilfordi* on the islet of Aire, a coastal islet of Minorca (Balearic Islands, Spain). They describe the interaction between this lizard and the plant species *Dracunculus muscivorus*. The flowers of this plant are arranged in an inflorescence, the spadix, surrounded by a large spathe that has a long and narrow tube at its base, hiding the lower part of the spadix. The plant produces a fetid odor of decomposed meat that serves to attract flies of several families. The flies land on the spadix or on the large surface of the spathe and normally enter into the spathe-tube where they pollinate female flowers with pollen from other previously visited plants. The insects are then trapped in the spathe tube for some time by hairs from the inner walls of the spathe-tube. On 2 April 1999 a random 4-hour search of the southern part of the islet of Aire revealed 37 individual *P. lilfordi* perching on *D. muscivorus* spathes. During this period the authors observed the capture of one fly trapped in the spathe-tubes of the plant and four flies from the flower spadix. Eighteen unsuccessful capture bouts of flies by lizards were also recorded, and nine lizards were seen searching into the spathe-tubes of other individual plants. The authors conclude that *D. muscivorus* is commonly employed as a perch site by *P. lilfordi* to capture flies attracted by its odor. During a second visit to Aire in June 1999 several lizards were observed eating fruits of *D. muscivorus*. On the same day the authors obtained 99 *P. lilfordi* feces samples. In 70% of the feces they found one or more seeds of *D. muscivorus*; 53% of the feces were composed only of seeds of this plant species. Thus, during its fruiting period this plant is an important food item for many individual lizards. The seeds were apparently intact in the feces, suggesting that *Podarcis lilfordi* can be a legitimate seed disperser of *Dracunculus muscivorus* in Aire islet, although that point would need to be confirmed with germination tests.

DEVELOPMENTAL STAGING FOR AN AMBYSTOMATID

S. Watson and A. P. Russell [2000, Amphibia-Reptilia 21(2): 143-154] provide a posthatching developmental staging table for the larval phase of the northern long-toed salamander (*Ambystoma macrodactylum krausei*). This is the first such table for an ambystomatid salamander. Stage boundaries are based upon limb development prior to the metamorphic transition and upon gill resorption during metamorphosis. Comparison is made to other published staging tables for salamanders of other families and anecdotal accounts of other ambystomatids; similarities and differences are noted. These comparative data suggest that limb development may differ between species of *Ambystoma* in terms of the relative timing of hind-limb and forelimb morphogenesis.

STRIPED MUD TURTLE NESTING

D. S. Wilson et al. [1999, Copeia (4):958-968] studied the nesting ecology of *Kinosternon baurii* on a sandhill in central Florida from September 1991 through February 1995. Gravid females were marked and tracked to their nest sites using thread bobbins attached to the carapace. Peak nesting season was September through November with a second minor peak in June. Females laid 1-3 clutches per year. When left unprotected from predators, egg predation was 100%; however, when nests were protected from predators, 88% of the nests had full or partial embryo survival to hatching. Nesting females moved an average of 137 m from the wetland to their nest sites and showed fidelity to a particular nesting area among years. Movements to and from nest sites coincided with rainfall. As documented for other kinosternid species, females of *K. baurii* prolonged their stays on the sandhill after nesting by burying underground near their nest sites. Deterrence of egg predators from the nest site as a result of the female's presence has been suggested as a possible explanation for why females do not return to the wetland immediately after nest completion; however, physiological limitations caused by energy expenditure and/or evaporative water loss also may aid in explaining this behavior.

LEARNING IN FREE-RANGING WHIPTAIL LIZARDS

J. J. Schall [2000, Herpetologica 56(1):38-45] reports that the Bonaire island whiptail lizard, *Cnemidophorus murinus*, feeds primarily on plant materials but avoids those containing toxic compounds. He conducted experiments to determine if the lizards would learn to discriminate palatable (containing tomato juice) and distasteful (quinine hydrochloride added) artificial fruits (= "fruits") based on their color or location. In experiment 1, lizards were trained for 19 days with red (palatable) and green (toxic) fruits placed in vegetation. During days 20-21, only palatable fruits were presented; the lizards fed substantially more on red fruits. In experiment 2, all fruits were the same color at a site (green in vegetation at one site, red along a fence at another). Fruits placed at half the locations were consistently palatable and half toxic. After 11 days of training, only palatable fruits were presented at all locations at each site. Lizards fed more on the formerly always palatable fruits at one site (fruits in vegetation) than another (fruits placed on the uniform fence). Experiment 3 trained lizards with fruits (red toxic, green palatable) attached to the ground (low cost to approach and to test fruits). After 15 days of training, the lizards approached red and green fruits equally often. However, when the fruits were later placed into vegetation (higher cost to approach the fruits), the lizards fed more on the green fruits. These experiments demonstrate that populations of *C. murinus* show rapid changes in behavior when presented with novel foods and suggest that individual lizards learn color and location as cues to avoid or to approach food items.

PLOUGHSHARE TORTOISE HOME RANGES

L. L. Smith et al. [1999, *Chelonian Conservation and Biology* 3(3):393-400] radio-tagged and tracked 13 wild angonoka or ploughshare tortoises (*Geochelone yniphora*) for up to two years to define and quantify the home range and document microhabitat use of this endangered tortoise. Wet season home ranges were larger than dry season ranges ($t = 2.88$; $df = 12$; $p = 0.02$); however, considerable individual variation was observed. Mean wet season home range for male tortoises was 21.1 ha ($n = 3$; $SD = 6.4$) as compared to only 6.6 ha ($SD = 4.5$) in the dry season. For females, the mean wet season home range size was 12.2 ha ($n = 5$; $SD = 9.4$), whereas mean dry season home range was only 3.6 ha ($SD = 5.0$). Mean wet season home range in juveniles was 1.8 ha ($n = 5$; $SD = 1.8$) as compared to 0.6 ha ($SD = 0.5$) in the dry season. In general, angonoka used microhabitats according to their availability; however, seasonal effects on habitat selection were detected. Tortoises were encountered more often in open unvegetated areas during the wet season than during the dry season, when open grassy areas were more commonly used. The shifts in microhabitat use observed in this study may relate to seasonal differences in temperature and moisture. These shifts underscore the importance of maintaining vegetative diversity in angonoka habitat.

BLIND SNAKE FOLKLORE IN THAILAND

O. S. G. Pauwels et al. [2000, *Hamadryad* 25(1):29-37] report that the tiny snake called *ngoo-how-pak-pet* is worshipped by the inhabitants of the southern Siamese peninsula, who zealously keep dried and perfumed specimens at home as lucky charms, and attribute to it a mythical kinship. According to some, the snake originates from *nok-karaweg*, the king of the birds in paradise. Others believe it is the son of the giant snake *pa-yaa-ngoo-yai*. These legends seem to derive from Indian mythology. The specimens that the authors obtained were provisionally referred to the typhlopoid species, *Ramphotyphlops braminus*.

BROWN TREE SNAKE BEHAVIOR

M. J. Greene and R. T. Mason [2000, *Herpetologica* 56(2):166-175] note that the brown tree snake, *Boiga irregularis*, is an introduced pest species on the island of Guam where it has caused significant economic and ecological damage. Despite the need for basic biological information about this species to manage it effectively, little is known about its reproductive behavior. The authors report on the repertoire of reproductive behaviors displayed by this species. The courtship behavior of the brown tree snake parallels that of other colubrids, adhering to the triphasic schema developed to standardize descriptions of colubrid courtship; nonetheless, there are differences in the specific behaviors displayed. Unlike most colubrids, female *B. irregularis* employ courtship behaviors normally displayed only by males. In addition, females can inhibit male courtship by use of a pheromone released in a liquid secretion from the cloaca. Male brown tree snakes show ritualized combat behavior similar to that observed in other colubrid species. Longer and heavier males always won combat events in the study.

VARIATION IN TIMES OF FROG CALLING ACTIVITY

A. S. Bridges and M. E. Dorcas [2000, *Copeia* (2):587-592] note that recent awareness of amphibian declines has raised the need for effective monitoring programs. Call surveys are a standard approach to monitoring populations of most anuran species. Temporal variation in calling activity, however, may result in failure to detect some species. Automated recording systems (ARS) allow consistent sampling for extended periods with little or no disturbance to calling anurans. The authors used an ARS to measure temporal variation in anuran calling activity during the summer of 1997 at a Carolina bay on the U.S. Department of Energy's Savannah River Site, South Carolina. They documented considerable interspecific variation in calling activity, a phenomenon that, using traditional call survey techniques, would result in failure to detect some species. In particular, they found that southern leopard frogs (*Rana sphenoccephala*), thought to breed only in early spring and fall in the region, called consistently from midnight until dawn during July. Because protocols for most call surveys dictate that the listener survey only during early evening hours, most call surveys would not detect the presence of this species. The results indicate that temporal variation in anuran calling activity warrants further investigation and should be considered when developing anuran monitoring programs.

A NEW GENUS OF AGAMIDS FROM BORNEO

U. Manthey and W. Denzer [2000, *Hamadryad* 25(1):13-20] erect the new genus *Hypsicalotes* for *Calotes kinabaluensis*, hence the new combination *Hypsicalotes kinabaluensis*. This species has formerly been considered congeneric with either *Calotes* or *Pseudocalotes*. The intergeneric differences between the closely related genera *Bronchocela*, *Calotes*, *Hypsicalotes* and *Pseudocalotes* are discussed. The recently described *Gonocephalus schultzei* Urban, 1999, is placed in the genus *Hypsilurus*, therefore the new combination *Hypsilurus schultzei*. *Salea brachydactyla* Rendahl, 1937, is relegated by the authors to a junior synonym of *Salea kakienensis* (Anderson, "1878" 1879).

URTD IN FLORIDA GOPHER TORTOISES

J. E. D. Berish et al. [2000, *J. Herpetology* 34(1):5-12] collected blood samples from 386 gopher tortoises (*Gopherus polyphemus*) on 53 sites in Florida to determine exposure to a pathogen (*Mycoplasma agassizii*) that causes upper respiratory tract disease (URTD). One-hundred fourteen (30%) of the tortoises were seropositive, indicating that they had been exposed to mycoplasma and had developed a detectable immune response. Another 20 (5%) were considered suspect. The remaining 252 (65%) tortoises were seronegative. The 114 seropositive tortoises were from 14 locations, 12 of which were public lands. Thirty-nine percent of the 386 tortoises showed one or more clinical signs of URTD. Nasal lavage samples were collected from 89 tortoises on eight of the 53 sites. Four tortoises (4%) from three sites were positive, indicating presence of mycoplasma. A different mycoplasma was indicated on each of the three sites.

CTENOSAUR SYSTEMATICS

G. Köhler et al. [2000, *Amphibia-Reptilia* 21(2):177-191] analyzed the phylogenetic relationships of the species of the genus *Ctenosaura* using two independent data sets derived from morpho-etho-ecological characters and genetic (RAPD) markers. The analysis of the data matrix based on morpho-etho-ecological characters yielded a consensus tree with the species of *Ctenosaura* forming three clades. The consensus tree based on the RAPD data is not as well resolved as the morphological tree. The authors propose subgeneric status for the three monophyletic subgroups within the monophyletic genus *Ctenosaura*.

BENEFITS OF CANNIBALISM

K. J. Babbitt and W. E. Meshaka, Jr. [2000, *Copeia* (2):469-474] note that cannibalism provides a potential mechanism for enhanced growth and survival for species with complex life-cycles developing in habitats of unpredictable duration. They investigated whether background resource quality affected survival and metamorphosis of Cuban treefrog (*Osteopilus septentrionalis*) tadpoles fed conspecifics. In a factorial experiment, they crossed two levels of background resources, a high-quality (commercial rabbit chow) or low-quality (algae and periphyton) diet with no conspecifics, the presence of a dead conspecific (in a bag), or ad libitum availability of dead conspecifics. Survival of tadpoles did not differ significantly among treatments. Availability of conspecifics resulted in larger mass and decreased larval periods for tadpoles on low-quality background treatments; however, for tadpoles on high-quality background treatments, availability of conspecifics resulted in prolonged larval periods. These results suggest that profitability of feeding on conspecifics is dependent on background resource level and may partially explain why cannibalism is facultative and associated with low availability of alternative food or crowded conditions in most larval anurans.

SURVIVAL OF SPOTTED SALAMANDER EMBRYOS

S. L. Turtle [2000, *J. Herpetology* 34(1):60-67] notes that roadside wetlands are often contaminated by highway runoff; however, little is known about the impact of pollution on the organisms that use these wetlands. Most amphibians use wetlands as breeding habitats and are therefore vulnerable to aquatic pollutants. In 1995 and 1996, the author conducted transplant experiments to compare the embryonic survivorship of *Ambystoma maculatum* in temporary woodland pools to that in roadside pools. Chemical parameters were monitored to identify differences between roadside and woodland pool environments. Failure time analysis was used to compare embryonic survival probabilities for transplant experiments in both years. The results indicate that deicing salts heavily contaminate roadside vernal pools. *Ambystoma maculatum* survivorship was significantly lower in roadside pools for four of five transplants in 1995 and all transplants in 1996. Deicing salts used for highway maintenance contaminated roadside vernal pools, and are a possible factor in the reduced embryonic survival observed in these pools.

RAT SNAKES' EMERGENCE FROM HIBERNATION

G. Blouin-Demers et al. [2000, *Herpetologica* 56(2):175-188] note that substantial individual variation in timing of emergence from hibernation has been reported among reptiles, although few studies have addressed the causes of that variation. They report patterns of spring emergence by black rat snakes (*Elaphe obsoleta obsoleta*) observed at 13 communal hibernacula in eastern Ontario from 1992 to 1997. Because the study area is at the northern extreme of the species' range, they expected synchronous emergence given the very short active season (about 5 months). Despite these apparent time constraints, however, the emergence period lasted an average of 40 days. Although there was significant variation in time of emergence among years and among hibernacula, the authors found no evidence of a simple latitudinal gradient in mean emergence dates. Within hibernacula, significantly more snakes emerged on days with high maximum air temperatures, but maximum air temperature explained only a small amount of the variation among years in emergence dates. Larger individuals emerged earlier than smaller individuals, as predicted if early spring predation risk is higher for smaller snakes. Females tended to emerge slightly earlier than males. Condition was not a significant factor determining timing of emergence in our population. Individuals demonstrated significant repeatability between years in their time of emergence relative to other snakes in the same hibernaculum.

BOG TURTLE MOVEMENTS

S. L. Carter et al. [2000, *J. Herpetology* 34(1):75-80] radio-tracked 35 adult bog turtles (*Clemmys muhlenbergii*) at four study sites in southwestern Virginia (May 1995 to December 1996) to assess the scale and frequency of movement within and between wetlands and to identify the potential for population isolation. Net movements between subsequent locations recorded during 1995 (N = 18) and 1996 (N = 27) averaged 17 m and 18 m for females and 16 m and 23 m for males, respectively, and did not differ with respect to sex for either year. Net distances underestimated true bog turtle activity (measured by threadspooling) by a factor of 6.5. The length of time between net distance measurements (1-9 d) did not influence the resulting distance measured, suggesting that relatively short time intervals may not need to be considered when calculating activity estimates. Seventy-five percent of all net movements were <20 m, whereas only 2% were >100 m. Large-scale movements between wetlands were observed infrequently. Information regarding distance, timing, and proximate cues for movement is essential to further understanding of the behavior and ecology of turtles. Dispersal, although poorly studied, has profound implications for social behavior, genetic structure, and persistence of populations. If successful dispersal is limited to infrequent, large-scale movements, future wetland loss may serve to isolate some populations of bog turtles. Further study of the importance long-distance movements play in maintaining populations is needed to aid future conservation strategies in southwestern Virginia.

AGE, SIZE AND GROWTH OF THE ALPINE NEWT

C. Miaud et al. [2000, *Herpetologica* 56(2):135-144] studied a population of the alpine newt, *Triturus alpestris*, living at the upper limit of its altitudinal range (2200 m in the northwestern Alps) during the aquatic activity period. Age was estimated by skeletochronology applied to phalanges and body size was measured. Age structures were similar between sexes, with age at maturity at 9–11 years and longevity up to 20 years. Annual survival was 0.81. Females were significantly larger than males. Growth was higher in females during the juvenile period. A comparative analysis of age and size at maturity, mean size, and longevity in several European populations distributed from sea level to high altitudes shows a significant increase in these phenotypic variables with the decrease of the duration of the activity period. The growth coefficient K , indicating the shape of the curve, is smaller in highland than in lowland populations, and the asymptotic size is smaller in the plain than at higher attitude. If adult size increases with altitude, age at maturity is extensively delayed in short activity period environments. However, age and size of newts can also depend on traits of the previous stages of the life cycle, and the authors review several characteristics of the egg and larval stages in response to environmental gradients.

A NEW SPECIES OF FRINGE-LIMBED TREEFROG

J. A. Campbell et al. [2000, *Herpetologica* 56(2):250-256] note that despite their large size, the species of fringe-limbed treefrogs are elusive and are poorly represented in museum collections. They describe *Hyla dendrophasma*, a new species of the fringe-limbed group of hylids from the cloud forest of the Sierra de Los Cuchumatanes of northwestern Guatemala. This frog may be distinguished most easily from other members of the group by the poorly developed dermal fringe along the lower outer edge of the forearm and a mere trace of a fringe on the tarsis. This new species also is characterized by its large size (84.1 mm SVL), fingers that are two-thirds webbed, nearly fully webbed feet, and lack of integumentary–cranial co-ossification. This new species most closely resembles *Hyla echinata*, which occurs to the west of the Isthmus of Tehuantepec in the Sierra de Juárez of Oaxaca and which is the probable sister-species.

LIZARDS OF THE GENUS *PSEUDOCALOTES*

J. Hallermann and W. Böhme [2000, *Amphibia–Reptilia* 21(2): 193-210] describe *Pseudocalotes dringi*, a new species from the mountain forest of Western Malaysia. The holotype of the new species was formerly regarded as a syntype of *P. floweri*. A review of all species of the genus is given including a differential diagnosis and a key to the species. Diagnostic characters for the genera *Bronchocela*, *Calotes* and *Dendragama* (which together with *Pseudocalotes* formerly made up the genus *Calotes*) are given. *Paracalotes poilani* and *Pseudocophotis sumatrana*, showing all diagnostic characters of the genus *Pseudocalotes*, are included in that genus. Members of *Pseudocalotes* of the Indochinese region can be differentiated from members inhabiting the Sunda region by the shape of the scales under the third toe.

LIVE-BEARING IN SALAMANDERS

H. J. Dopazo and M. Korenblum [2000, *Herpetologica* 56(2): 144-152] note that ovoviviparity and viviparity have been described as derived reproductive modes in salamanders. Moreover, several authors have suggested that viviparity represents an adaptive solution to the harshness of high-altitude environments. Populations of *Salamandra salamandra* display ovoviviparity and viviparity as polytypic and polymorphic reproductive modes. This variation enables a test of the classic adaptive hypothesis of viviparity from a microevolutionary perspective. Comparative analyses in six populations of *S. salamandra* have shown non-significant associations between altitude of populations and viviparous traits. Although the authors caution that these preliminary results must be corroborated with the study of more populations, they suggest an internalist hypothesis that takes into account the ubiquitous production of unfertilized, nutrient eggs in viviparous females. Thus, viviparity might have evolved as a byproduct of intraoviductal competition for resources by developing larvae. In this context, an exaptive rather than an adaptive scenario might explain the origin of viviparity in *S. salamandra* and other urodeles.

GRAY RAT SNAKE FORAGING ECOLOGY

S. J. Mullin and R. J. Cooper [2000, *Amphibia–Reptilia* 21(2): 211-222] note that a predator's behavior and success when foraging can be compromised by a variety of environmental factors. They examine the effect of variation in habitat structural complexity on the predatory success of the semi-arboreal gray rat snake (*Elaphe obsoleta spiloides*) foraging for arboreal bird nest contents. Individual snakes searched for nests in enclosures containing one of five levels of vegetation density that reflected the range of structural complexity measured at a field site where predator and prey species are common. Subjects were most proficient at locating prey in enclosures having low levels of structural complexity, and experienced decreased predatory success in barren or highly-complex habitats. Ten behaviors comprised over 95% of the trial durations, and four of these occurred more often than the other six regardless of variation in structural complexity within the enclosure. The authors suggest that low levels of structural complexity offer snakes concealment from predation while not obscuring their view of provisioning activity at the nest.

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For sale: Out of print natural history and herpetology books. For list send SASE to Bill Borek, P.O. Box 1152, Sharon CT 06069.

For sale: books. F. Parker — *The Snakes of Western Province* (New Guinea), no date, 78 pp., many b & w photos, softbound, \$75; Passmore and Carruthers — *South African Frogs*, 1979, 270 pp., many color and b & w photos, includes record of frog calls, hardbound, DJ, \$45; Floyd Dale — *Forty Queensland Lizards*, 1973, 64 pp., drawing of each species, range maps, softbound, \$12; G. M. Storr — *Dangerous Snakes of Western Australia*, 1977, 24 pp., 15 b & w photos, softbound, \$12; Dr. Struan Sutherland — *Poisonous Australian Animals*, 1983, 48 pp., color photos and cartoons, contains info on snake bite treatment, plastic covers, \$15; Timothy Flannery — *Tree Kangaroos, A Curious Natural History*, 1996, 202 pp., excellent color plates, b & w photos, summarizes current knowledge of these animals, hardbound, as new condition, \$80. Books in excellent condition, prices postpaid. William R. Turner, 7395 S. Downing Circle W., Littleton, CO 80122 (303) 795 -5128; E-mail: turnerbmrk@prodigy.net

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For sale: Send SASE to CRC, P.O. Box 0731, Las Vegas NV 89125-0731 for brochures and list of species available. Limited bookings available for guided tours of herpetological collection sites in Nevada. Call/fax (702) 450-0065. URL <http://www.herp.com/crc/> E-mail: crsafetie@aol.com.

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Line ads in this publication are run free for CHS members — \$2 per line for nonmembers. Any ad may be refused at the discretion of the Editor. Submit ads to: Michael Dloogatch, 6048 N. Lawndale Avenue, Chicago IL 60659, (773) 588-0728 evening telephone, (312) 782-2868 fax, E-mail: <MADadder0@aol.com>.

News and Announcements

SIXTEENTH ANNUAL MIDWEST HERPETOLOGICAL SYMPOSIUM — OCTOBER 13–15

The 16th annual Midwest Herpetological Symposium will be hosted by the Kansas City Herpetological Society from Friday, October 13, through Sunday, October 15, at the Kansas City Airport Hilton in Kansas City, Missouri. The schedule of events is as follows: Registration will be open on Friday from 4:00 to 9:00 P.M. Also on Friday evening an icebreaker will be held from 7:00 to 9:00 P.M.; after 9:00 P.M. a hospitality suite will open with complimentary pizza, beer, soda and snacks. Saturday's schedule includes lectures from 8:00 A.M. to 5:00 P.M., cocktails at 6:00 P.M., a banquet at 7:00 P.M. featuring Andy Highfield speaking on "Twenty Years of Travel with Tortoises," an auction from 9:00 P.M. on, and the hospitality suite after the auction. Sunday from 9:00 A.M. to 4:00 P.M. will be the KCHS Fall Breeders Expo.

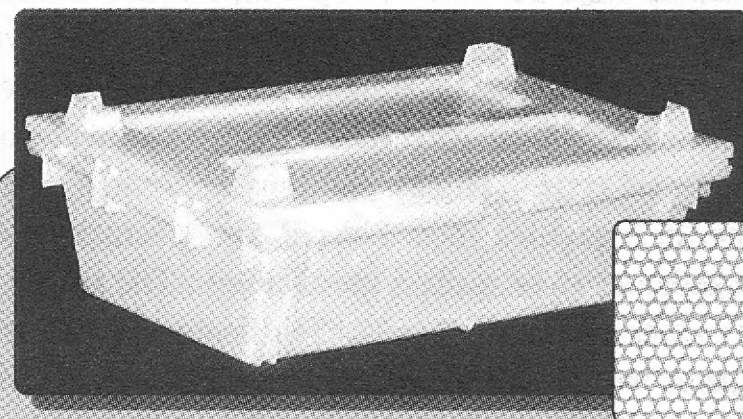
Saturday's speakers and their topics will include: Robert Applegate, "Breeding Kingsnakes and Milksnakes"; Jeff Ettling, "Captive Management of Venomous Reptiles"; Richard Evans, "Keeping and Breeding of Western Hognose Snakes"; Andy Highfield, "Chelonian Husbandry"; Peter Kuhn, "Captive Reproduction of Australia's Dwarf Monitors"; Bert Langerwerf, "Captive Propagation of Lacertas"; Dr. Ross Perran, "Challenges for Crocodile Conservation"; Dr. Scott Stahl, D.V.M., "Why and How to Quarantine Your Herps" and "Reptile Obstetrics"; and Terry Vandeventer, "Natural History of the *Boa constrictor* Species Complex."

The registration fee for the conference is \$50 before September 22, \$60 thereafter. The optional banquet is an additional \$25.00 per person before September 22, \$30.00 thereafter. Vendor table fees are \$60 per 8-foot table, with a maximum of three tables per vendor. Dry goods vendors are welcome to set up for all three days of the symposium. The Kansas City Airport Hilton is holding a room rate of \$79.00 per night (up to 4 people per room) for symposium attendees only through September 20. *Ask for it when you call.* A registration form for the symposium is included in this *Bulletin*. If you have questions or if you need a vendor application form, write to KCHS, P.O. Box 118, Liberty MO 64069, or contact David Nieves, (816) 468-5609 phone, (816) 468-8441 fax, E-mail: nieves4@ibm.net, or Michael Humphrey, (816) 587-8502, E-mail: humper@ibm.net.

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UPCOMING MEETINGS

The next meeting of the Chicago Herpetological Society will begin at 7:30 P.M., Wednesday, August 30, at the Peggy Notebaert Nature Museum, Cannon Drive and Fullerton Parkway, in Chicago. Our speaker will be **Jake Socha**, a fifth-year graduate student in biomechanics at the University of Chicago. Jake will speak on “Flying Snake Biomechanics — Fun with Fearless Flyers.”

The September 27 meeting will feature workshops led by local CHS experts, covering various aspects of herpetoculture.

The Chicago Turtle Club

The next meeting of the Chicago Turtle Club will be on Sunday, August 27, 1:00 – 4:00 P.M., at the North Park Village Nature Center, 5801 N. Pulaski, in Chicago. Eleanore Farrell and Steve Spitzer will conduct a Box Turtle Hibernation Workshop. Meetings are informal; questions, children and animals are welcome. Parking is free. For more info call Lisa Koester, (773) 508-0034, or visit the CTC website: <http://www.geocities.com/~chicagoturtle>.

NEW MEETING SITE

The regular monthly meetings of the Chicago Herpetological Society now take place at Chicago's newest museum — the **Peggy Notebaert Nature Museum**. This beautiful new building is at Fullerton Parkway and Cannon Drive, directly across Fullerton from the Lincoln Park Zoo. Meeting dates will continue to be the last Wednesday of each month. Meetings start at 7:30 P.M. and last until 9:30 P.M. Parking is free on Cannon Drive. During the summer months the Lincoln Park Zoo lots across Fullerton charge \$7. A plethora of CTA buses stop nearby.

DONATIONS TO THE JUNE 28 RAFFLE

The following is a listing of those businesses and individuals who generously donated items for our monthly raffle at the June 28 meeting. The donated items are shown in parentheses.

Aquarium Systems (Millennium 2000 filter); **Fluker** (Cricket Quencher); **Rep-Cal** (bearded dragon food); **Midwest Zoological Research** (NutriBACdf supplement); **Mardel** (herp husbandry supplies); **Zoo Med** (iguana food); **Fancy Publications** (*Reptiles* magazine subscription); **Super Pet** (rock pool cover / Island Sanctuary / ceramic dishes); **Hagen** (OrnamentAlls cage decor / Repti-por odor remover); **Ghann's Cricket Farm** (cricket gift certificates); **Don Wheeler** (autographed print); **Will Forcade** (herp night light); **Ilene Sievert** (plant); **Lori King** (herp piñatas / dino T-shirt); **Jack Schoenfelder** (herp book / herp plush toy / 20-gallon aquarium / goldfish bowl); **Sally Hajek** (color herp prints); **Gary Fogel** (lizard squeaky toy); **Rich Crowley – CHS adoptions** (heat rock); **CHS** (herp T-shirt).

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